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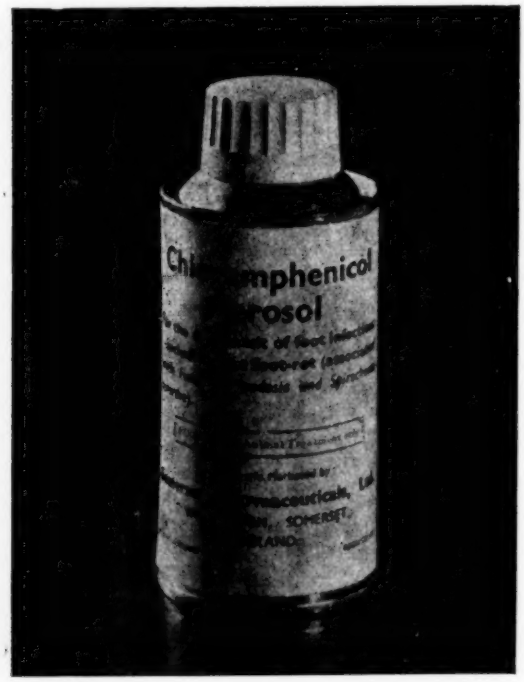

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## The Implantation of First-Instar Larvae of *Hypoderma* into Experimental Animals

BY

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*SUMMARY.—First-instar larvae of* Hypoderma *obtained from slaughtered cattle were implanted into guinea-pigs, mice, rats, rabbits and calves. Live larvae were recovered later from all types of animals and in rabbits up to 98 days after implantation. In both calves and rabbits typical warbles appeared in the skin of the back. First-, second- and third-instar larvae emerged from the calves but only first-instar larvae were recovered from rabbits. It is concluded that implanting larvae of* Hypoderma *is a practical means of establishing infestations in rabbits and furthermore such infestations can be maintained for a time adequate for the testing of larvicidal substances.*

### Introduction

THE control of the Ox Warble Fly, *Hypoderma*, has always presented a considerable problem. The only practicable method of breaking the life-cycle of the fly lies in killing the larvae within the bovine host. Insecticides of various types have been incorporated in washes which have been scrubbed into the backs of infested animals but only rotenone, the active principle of derris, has so far proved of much value for external application. Unfortunately, while derris will eliminate the encysted third-instar larvae it cannot prevent these larvae from forming warbles under the skin and hence depreciating the value of the hide.

In an early attempt to demonstrate the life-cycle of the warble fly, Koorevaar (1898) transferred first-instar larvae, which he had obtained from their temporary resting places beneath the mucous membrane of the oesophagus of cattle, into the subcutaneous connective tissue of dogs and goats. Bishopp *et al.* (1926) transplanted larvae into calves and adult cattle and examined the possibility of the development of *Hypoderma* larvae in animals other than the ox. The transplant technique was used later to test drugs which it was hoped would be effective against the young migrating larvae of *Hypoderma* (Barrett & Wells, 1948).

Recent work on systemic insecticides has resulted in the discovery of two promising organic phosphorus compounds, Dow ET-57,* and Bayer 21/199, which will prevent the development of *Hypoderma* larvae in the treated animal (Smith & Richards, 1954 ; Roth & Eddy, 1957). German workers have reported success with a third organic phosphorus compound, Bayer L 13/59,† which is recommended for both systemic and external application (Rosenberger, 1957).

In view of the possibility of further advances in the use of systemic insecticides for the control of *Hypoderma*, the development of a practical method of establishing infestations in laboratory animals was obviously desirable. This paper describes the implantation of first-instar larvae into a series of experimental animals.

### Materials and Methods

First-instar larvae of *Hypoderma* were obtained from cattle slaughtered at the Guildford abattoir. Numerous larvae of *H. lineatum* were dissected from the connective tissue beneath the mucous membrane

* Trolene.
† Neguvon, Dipterex.

of the oesophagus ; up to 85 larvae were obtained from one animal. A few larvae of *H. bovis* were found in the shreds of tissue which remained in the exposed halves of the spinal canal. The larvae were washed in warm physiological saline and were then transferred to fresh saline solution containing 200 units penicillin per ml. and were kept in an incubator at 37° C. before implantation. The smaller experimental animals, *i.e.* guinea-pigs, mice, rats and rabbits, were anaesthetised with pentobarbitone sodium.* An incision was made in the skin on the inner aspect of the thigh and a pocket was formed in the loose subcutaneous connective tissue. From 4 to 20 larvae were placed in the pocket and the skin wound was then closed with sutures. In 2 calves 60 and 36 larvae respectively were placed in the subcutaneous connective tissue behind the shoulder. After implantation animals were inspected daily, the skin was palpated for signs of migrating larvae and a check was made for any larvae which had emerged. At intervals after implantation, animals were killed and examined for the presence of larvae.

## Results

The implanted larvae were capable of quite rapid movement in the subcutaneous tissues ; about 2 in. daily. They usually dispersed from the pocket in less than 24 hours after implantation and in a majority of the animals no adverse effects were noted. In mice, however, widespread subcutaneous haemorrhages occurred within 24 hours and some irritation was noted in rats and guinea-pigs. A few of the rabbits scratched open the pockets before the larvae had dispersed ; the results from these rabbits have not been recorded. Once they had left the pocket the larvae appeared to migrate mainly towards the head and soon reached the back and anterior parts of the smaller animals. Some larvae penetrated the tissues in the region of the neck and migrated into the thoracic cavity. In a guinea-pig a larva was found attached to the oesophagus and in one of the rabbits a larva was found in the cranial cavity lying on the brain. Most of the larvae which were recovered, however, were found in the subcutaneous connective tissues in which their tracks could be traced.

In the rabbits it was possible to detect larvae by palpation beneath the skin of the back and on the sides of the abdomen. Some penetrated the skin without the formation of localised swellings, while others formed typical warbles. Thus, one of the rabbits developed on its back 2 warbles containing first-instar larvae which were visible through the breathing holes. The larvae did not mature, however, and eventually emerged on the 31st and 37th days respectively after implantation.

No significant differences from *H. lineatum* were observed in the behaviour of the few *H. bovis* larvae which had been implanted.

The numbers of larvae of *H. lineatum* recovered from the smaller animals other than rabbits are given in Table I and those recovered from rabbits in Table II. In some rabbits one or more larvae had emerged from the skin before the date of *post-mortem* examination. The relationship between the percentage of larvae recovered alive at *post-mortem* and the time

* Nembutal : Abbott Laboratories Ltd.

TABLE I
THE RECOVERY OF *Hypoderma lineatum* LARVAE FROM GUINEA-PIGS, MICE AND RATS

| Animal | | Total recovery | Time after implantation (days) | |
|---|---|---|---|---|
| Guinea-pig | 1 | 0/4 | 76 | |
| | 2 | 1/4 | 36 | |
| | 3 | 0/6 | 35 | |
| | 4 | 0/7 | 7 | |
| | 5 | 0/4 | 37 | |
| | 6 | 5/5 | 1 | (Haemorrhage, animal killed) |
| | 7 | 0/5 | 42 | |
| | 8 | 0/6 | 28 | |
| Mouse | 1 | 5/5 | 1 | All three mice died following extensive haemorrhage into the subcutaneous tissues. |
| | 2 | 10/10 | 1 | |
| | 3 | 5/10 | 6 | |
| Rat | 1 | 2/6 | 36 | |
| | 2 | 0/5 | 71 | |

TABLE II
THE RECOVERY OF LARVAE OF *Hypoderma lineatum* FROM RABBITS

| No. of larvae implanted per rabbit | No. of rabbits in group | No. of larvae which emerged | Larvae alive at P.M.E. | Larvae dead at P.M.E. | Total recovery per cent. |
|---|---|---|---|---|---|
| 5 | 1 | 0 | 0 | 0 | 0 |
| 8 | 2 | 0 | 0 | 0 | 0 |
| 9 | 2 | 1 | 0 | 1 | 11·1 |
| 10 | 5 | 4 | 13 | 1 | 36·0 |
| 12 | 3 | 0 | 15 | 1 | 44·4 |
| 15 | 13 | 1 | 20 | 9 | 15·4 |
| 16 | 1 | 0 | 1 | 1 | 12·5 |
| 19 | 1 | 0 | 0 | 0 | 0 |
| 20 | 2 | 2 | 3 | 0 | 12·5 |

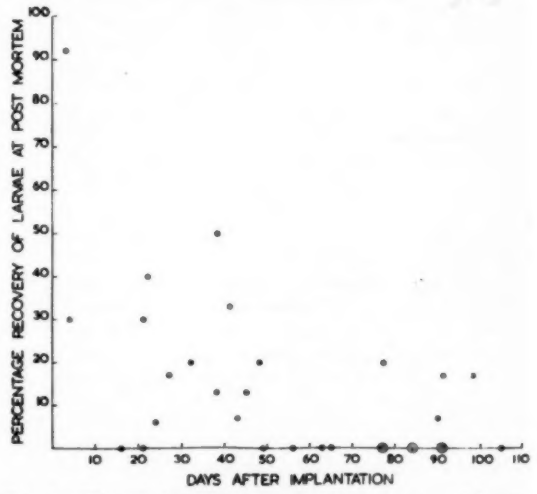


FIG. 1.—The relationship between the percentage of larvae recovered alive at *post-mortem* examination and the time after implantation into rabbits.

after implantation into rabbits is shown in Fig. 1. Live larvae were recovered from rabbits up to 98 days after implantation.

On the 22nd day after implantation warbles began to appear on the back of the calf which had received 60 larvae ; altogether, a total of 12 warbles developed. Only 2 larvae emerged, one first and one second-instar. The second calf had 2 warbles which appeared on the 13th and 36th days respectively. On the 43rd day a first-instar larva was seen in one of these warbles and on the 76th day a third-instar larva was squeezed out.

## Discussion

It is clear from a consideration of the results obtained in the present observations and from those described by Bishopp *et al.* (1926) and Barrett & Wells (1948) that first-instar larvae of *Hypoderma* can be transplanted successfully into calves and laboratory animals. In the present study more rabbits were used than guinea-pigs, rats or mice because it was apparent early in the investigations that these smaller animals were unable to tolerate the larvae which at that period (November to December) were approximately 7 to 11 mm. in length. A further reason was that it was possible to implant larger numbers of larvae into each rabbit due to the greater size of the pocket which could be formed without difficulty in the loose areolar subcutaneous tissue inside the thigh. As it was anticipated that the average size of the larvae which would be collected from the slaughterhouse would increase over the winter months, it was decided for reasons of consistency to use rabbits throughout the experiment. Barrett & Wells (1948) considered that white mice were useful animals for preliminary chemotherapeutic tests provided small first-instar larvae were implanted and that the mice were used 3 to 4 days after implantation.

The migration of the larvae is of interest. Some larvae apparently retraced a route similar to that which they had followed as early first-instar larvae in the ox, *i.e.* from the site of skin penetration to the oesophagus. A majority, however, after migrating forwards from the site of implantation continued on the migratory route which they would have followed after leaving the oesophagus of their original host, *i.e.* up to the subcutaneous tissues of the back. This was to be expected, as all the implantations were carried out in the period from November to February which in Britain is the latter part of the season during which larvae of *H. lineatum* rest in the oesophagus. It was noted that by February there was a drop in the numbers of larvae in the gullets of slaughtered cattle, many presumably having already migrated. It is possible that a different pattern of migration would have been observed in the experimental hosts if implantations had commenced earlier in the season.

It is interesting to speculate on the forces which influence the movements of the larvae. As stated above, the overall direction of migration is probably determined by the length of time which the larva has spent in the resting stage. Subject to this limitation, the actual route which is followed appears to be decided by the availability of loose areolar connective tissue in which the larva has freedom to move. In response to a stimulus which is not at present known, this movement results in the arrival of larvae beneath the relatively immobile skin of the back where they can penetrate the skin and then remain beneath the puncture. When they reached the back, some larvae in both rabbits and calves found conditions suitable for the continuation of their development and the formation of warbles, but it was only from calves that second- or third-instar larvae were recovered.

The spontaneous emergence from rabbits of first-instar larvae after their arrival in the back, or shortly after the formation of warbles, may indicate that further development is not possible in this abnormal host but as this observation is based on the results from only 4 rabbits definite conclusions cannot yet be drawn. Table II and Fig. 1 show that although a majority of the larvae which had been implanted into rabbits did not survive in the new host animal, a sufficient number of living larvae were found on *post-mortem* examination to make the technique a useful one.

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## FIFTY YEARS AGO

### ON CLIENTS

It has been truly said that the veterinary surgeon has to treat the owner as well as the animal, and the manner and method which he adopts in dealing with the owner exerts a very important influence on the question of his being employed on future occasions.

We hear a good deal with reference to skill and a scientific education being essentials to success in practice. A fairly long experience amongst clients of various classes has taught us that although the minority are able to appreciate the value of skill and science, the majority fail to do so. Hence it happens that the practitioner who possesses tact and a knowledge of the ways, whims, and peculiarities of mankind is able to secure and retain clients, while another equally skilful and far more scientific in his methods, but devoid of the qualities mentioned above, cannot be described as a success in practice.

The possessor of tact is able to accomplish many things which tend to enhance his reputation.

In the first place he can impress his clients with the amount of knowledge and skill that he possesses. He does not hide his light under a bushel, and he leads the public to believe that every case that recovers depends on his skill and attention. But more important still, he is able to conceal his ignorance and to gloss over his errors in diagnosis and treatment. All this implies a profound knowledge of human nature, as well as the possession of power to grasp the situation, and of acting well a part.

# The Uses of Concentrated Pentobarbitone Sodium Solution in Bovine Practice

BY

**M. B. TOOSEY**

**Wimborne**

*SUMMARY.*—1. *Indications for the use of concentrated pentobarbitone sodium solution* in routine cattle practice are presented:—*

(a) *Restraint by sedation.*

(b) *Basal narcosis in conjunction with chloral hydrate or local anaesthetics.*

(c) *Anaesthesia.*

2. *The termination of sedation and anaesthesia by the administration of β methyl β ethyl glutarimide (bemegride)† is described.*

3. *Case reports are included which are representative of 50 cases of sedation, 15 cases of basal narcosis, and 9 cases of anaesthesia.*

PENTOBARBITONE sodium was first used as a general anaesthetic in veterinary surgery in 1931 (Kreutzer *et al.*, 1931) and its use by the intravenous route in small animals was developed and popularised in Great Britain by J. G. Wright and his colleagues (Wright, 1939). Its applications in cattle have received little attention and few reports where pentobarbitone sodium has been used are to be found in the literature (Messervy, 1940). What reports are available emphasise the length of the post-anaesthetic narcotic period, especially in calves of less than 1 month of age (Wright, 1941). This has made pentobarbitone sodium somewhat unsuitable for use in general practice, and chloral hydrate, though not entirely satisfactory, has been preferred because of its shorter post-anaesthetic recovery period. The acknowledged disadvantages of chloral hydrate and the availability of concentrated solutions of pentobarbitone sodium, as well as the advent of an effective barbiturate antagonist, bemegride, prompted a reassessment of the practical applications of pentobarbitone sodium.

## Indications

There are 3 main indications for the use of pentobarbitone sodium in cattle practice :—

1. *As a sedative*

(a) For the suppression of nervous symptoms in such conditions as magnesium tetany.

(b) As a method of restraint for excitable and nervous animals prior to carrying out such minor surgical procedures as foot trimming, teat surgery and wound repairing.

(c) As a method of restraint for all animals when adequate assistance is not available.

2. *As a basal narcotic*

Pentobarbitone sodium can be used to induce narcosis in cattle prior to induction of anaesthesia by chloral hydrate. Such operations as rumenotomy, amputation of the digit and enucleation of the eyeball can be carried out satisfactorily and expeditiously with a minimum of assistance.

3. *As an anaesthetic*

Chloral hydrate narcosis may be followed by induction of anaesthesia with pentobarbitone sodium. The barbiturate may also be used to maintain anaesthesia induced by chloral hydrate. In all cases post-anaesthetic recovery rates have been relatively slow. If, however, sedation is established by the injection of pentobarbitone alone, all planes of anaesthesia can be easily and safely induced and just as rapidly, safely and easily counteracted by the injection of bemegride.

## Method

The injection used was a stable, sterile 20 per cent. solution of pentobarbitone sodium in an alcoholic solvent which ensures adequate mobility. In all cases weights were estimated independently by the author and the farmer, an average of the estimates being used for the purpose of calculating doses. Animals were restrained initially by a rope around the horns, or a halter, which was tied with a quick-release knot to a stanchion. Bulldogs were applied in the absence of assistance.

For *sedation*, the solution was administered by slow intravenous injection using the jugular or mammary veins. Administration was continued until the desired depth of sedation was reached, which in most cases was at the stage when the animal swayed slightly on the hind legs but was able to walk unaided. The dosage was approximately 0.5 to 1 ml. per cwt., or 6 to 7 ml. for the average Friesian cow.

For *basal narcosis*, an initial intravenous injection of about 1 ml. per cwt. of pentobarbitone solution was given slowly to the stage just short of the animal going down. Chloral hydrate was then given slowly through the same needle until the animal went down, and continued until the desired plane of anaesthesia was reached. If anaesthesia lightened during an operation, further intravenous injections of pentobarbitone sodium were given. Following this procedure animals usually regained their feet and were eating and drinking within 4 hours of the commencement of induction of narcosis.

The danger of thrombosis and sloughs from the use of chloral hydrate and the inconvenience of the large volumes required means that general anaes-

* " Trinaven " C. J. Hewlett & Son, Ltd., Watford.
† " Megimide " A. G. Nicholas, Ltd., Slough.

thesia is avoided wherever possible, often to the detriment of animal and operator. The following method has now been adopted for routine general anaesthesia and is used in preference to all other methods, many of which are time consuming and not applicable to routine general practice.

When used alone for *anaesthesia* the procedure is almost identical with that for pentobarbitone anaesthesia of small animals, though the dosage should be estimated at a lower rate—1/10 gr. per lb. bodyweight (approximately 3.3 ml. per cwt.). This usually gives anaesthesia at a depth of plane 111, but fat animals may take more, and thin or toxic animals will take less. Half the calculated dose is given rapidly by the jugular vein using a 20 ml. syringe : and injection should be completed in 30 seconds. The animal goes down and is usually depressed to the stage of light narcosis. Before proceeding with induction the animal is propped up on its sternum with its head and neck extended. The vein is re-entered and further pentobarbitone sodium solution is injected slowly in quantities of 1 to 3 ml., smaller doses being given as full anaesthesia is reached. Pauses between each injection should last from ½ to 1 minute, though this period may be extended towards the end of induction. Reflexes should be tested between each injection. It is rarely necessary to proceed beyond the stage where the palpebral reflex is lost but the corneal reflex is still present.

Recovery without the use of an antagonist may take as long as 7 hours from the commencement of induction. This has been reduced to as little as 10 minutes by the injection of a barbiturate antagonist.

### Barbiturate Antagonism

The relatively prolonged post-anaesthetic recovery period which follows the induction of anaesthesia with pentobarbitone sodium alone has reduced the usefulness of this compound as an anaesthetic in cattle practice. However, the recent introduction of bemegride has made it possible in many species to terminate anaesthesia at will (Shaw *et al.*, 1954; Cass, 1956; Schulman, 1956; Turner & Hodgetts, 1956; Macfarlane & Bentley, 1957; Jennings, 1958), but no information has been available on its use in adult cattle. The author has attempted to assess the effects on cattle anaesthetised with pentobarbitone sodium, and so far 9 cases of anaesthesia and 4 cases of sedation have been treated: the results have been spectacularly successful.

These few cases do not permit any firm estimation of dosage rates, but Case 2 indicates that there is a large safety margin. It is probable that 2.5 g. of the sodium salt given rapidly by intravenous injection as a 10 per cent. solution will suffice for lightening anaesthesia but 5 g. may be needed to terminate anaesthesia rapidly and permanently. The action of this antagonist is one of direct displacement of the barbiturate from the nervous tissue and an excess is therefore required for satisfactory action. This is borne out by results in practice for Case 3 recovered from all barbiturate effects following overdosage and did not relapse, whilst Cases 1 and 4 recovered partially (sufficient for practical purposes).

### Case Reports

*Case 1.* Friesian heifer of approximately 6 cwt., newly calved with 3 teats which were difficult to milk and one of the quarters affected with mastitis. The animal resented handling, kicking vigorously when the udder was approached. Teat dilation was impossible without strong restraint and anaesthesia was therefore decided upon.

Pentobarbitone was given by rapid intravenous injection into the right jugular vein, and the only restraint applied was a rope around the horns to pull the animal up to a rail with the head extended. 10 ml. were given over a period of 10 to 15 seconds. The animal went down and rolled over to the right with the hind legs extended, but no attempt was made to move from this position until efforts were made to raise her on to her brisket, when some attempt was made to draw her legs under her. The animal was adjudged to be in a stage of deep narcosis, and a further 3·0 ml. were given slowly by the right jugular. On examination of the reflexes all were absent except the corneal reflex ; the eye-ball was rotated and the lids closed. Breathing was slow and shallow, but regular and in no way laboured. Anaesthesia was estimated to be at the level of early plane 111 (see Campbell & Lawson, 1958.)

The teats were dilated with ease and expedition.

To shorten the period of anaesthesia, and terminate it, if possible, Megimide Sodium* was given 10 minutes after beginning the injection of the anaesthetic. A solution of 5 g. in 50 ml. Water for Injection was used and between 7 and 8 ml. were given intravenously into the left jugular taking about 30 seconds. The effect was immediate but only sufficient to bring the animal to the stage of light narcosis : the animal made several unsuccessful attempts to rise. A further quantity of approximately 12 ml. Megimide Sodium was given rapidly by the same jugular and the animal was on her feet 1½ minutes later. (This was 9½ minutes after the first dose of the antagonist.) She was unsteady on her legs but could walk unaided. Later she went down, but rose within 30 minutes of first getting to her feet and remained standing. Seven hours after induction of anaesthesia the heifer walked with the rest of the herd to be milked and was bright and intelligent.

Twenty-four hours later the animal was quite normal and in spite of mastitis in 1 quarter gave a milk yield which was 75 per cent. of normal. All teats were functioning well.

*Case 2.* Guernsey cow of about 9 cwt. with a stake or horn wound over the ribs just behind the point of the elbow : the wound was about 6 inches long and penetrated into the deep pectoral muscle. The animal would not allow adequate examination and some form of restraint was necessary. Pentobarbitone sodium sedation with local infiltration of procaine-type local anaesthetic was chosen.

Pentobarbitone was given intravenously into the right jugular, a dose of between 6 and 7 ml. being injected over a period of 30 seconds. The animal became depressed and swayed on the hind legs, needing a hand on the point of the ileum to steady her against the wall, though she was still able to walk with a stagger.

Local anaesthetic was infiltrated into the periphery of the wound and 5 deep sutures of braided nylon were inserted, a drainage hole being left at the bottom of the wound. One tube of intramammary penicillin was squeezed into the cavity and was dispersed by massage

Megimide Sodium, 2·5 g. in 25·0 ml. was injected as fast as the syringe would allow, using the left jugular vein. A reaction followed within 15 seconds of the commencement of injection : there was a tremor of the shoulder muscles, and an exaggerated response to movement and sound. The animal stood stock still with its legs spread and head down, looking very apprehensive; within a minute the trembling ceased, hypersensitivity subsided and she walked around the box as well as before administration of the anaesthetic.

*Case 3.* A dehorned Friesian cow weighing about 10 cwt. which had a Harderian glandular enlargement with protrusion of the third eyelid. The animal was very hypersensitive and it was impossible to approach the head without causing considerable excitement. Local anaesthetic alone was not a satisfactory solution. A halter and bulldogs were applied and an attempt made to give 25 ml. of pentobarbitone solution into the right jugular vein; unfortunately head movement changed the position

* A. G. Nicholas, Ltd., Slough.

of the needle and an unknown amount was injected perivascularly. A further 12 ml. were given rapidly and the animal went down on her right side with her hind legs extended; she made one or two abortive efforts to rise but relapsed into a state of deep narcosis as a further 6 ml. were given slowly. In view of the extravenous pentobarbitone the animal was not taken down to the stage of deep anaesthesia. The gland was excised though a little head movement occurred.

Megimide sodium was given about 10 minutes after beginning the pentobarbitone injection, 25 ml. being given rapidly into the left intramammary vein. The animal's state was immediately changed to one of sedation, but no attempt was m de to rise although she moved into a normal recumbent position. A further 20 ml. of the antagonist were given about 10 minutes later using the left jugular vein and taking about 15 seconds. The animal rose immediately the injection was completed without any prompting, though she was somewhat unsteady.

When visited 5½ hours later she had been up and down of her own accord but there was still slight swaying of the hindquarters. Her general condition was dull.

On a further examination 20 hours after injection of the anaesthetic the animal was bright, quite normal, and eating well. She had given 4½ gallons of milk in the morning as compared with 4¼ gallons in the morning before the operation. The eye was in good condition.*

*Case 4.* Friesian cow of approximately 10 cwt., recently calved and showing symptoms of traumatic reticulitis. Rumenotomy was decided upon.

Pentobarbitone was given by rapid intravenous injection into the right jugular vein and the cow went down after 18 c.c. was injected; a rope was then put around the horns and the cow was propped on her brisket.

The vein was re-entered and a further total of 13 c.c. was administered slowly, with pauses of 2 minutes between each injection until anaesthesia had reached early plane III. The whole of the induction period was quiet and there was no evidence of unfavourable reaction.

Rumenotomy was performed and a penetrating foreign body removed without any necessity of further injections of pentobarbitone.

After completion of suturing, 1·25 g. of bemegride were injected into the right jugular vein. This had the immediate effect of bringing the animal to the stage of light narcosis, but as no more bemegride was available it was not possible to lighten this further.

The animal was quite safe to leave unattended after this injection of bemegride, and was on her feet and eating well within a few hours of anaesthetisation.

Recovery from the operation was uneventful and the milk yield increased by 4 gallons in a week.

*Case 5.* The animal concerned was a heavily in-calf Friesian weighing in all about 12 cwt. A flint had entered the sole of the foot and had been pushed, laterally, by probing and using the foot, until it was lodged inextricably between the bone and the sole of the foot. Removal was impossible as the pain caused by probing caused continual movement. The case was therefore ideal for full anaesthesia, especially as the pedal reflexes are, apart from the eye reflexes, the last to be abolished.

An initial dose of about 17 ml. was injected over a period of 5 to 10 seconds into the right jugular vein. The cow became unsteady within a few seconds of stopping the injection and threatened to go down: the remainder in the syringe, approximately 8 ml. were given rapidly and the cow subsided on to the ground with only a small amount of struggling. The main movement consisted of throwing the head from side to side and this was easily controlled by tension on the rope placed around the horns for initial restraint during injection. Breathing became laboured and increased in rate but settled back gradually to normal. Reflexes were all present but sluggish: the cow could still support her head.

After a pause of about 2 minutes, a further 5 ml. dose was given slowly (5 to 10 seconds). This was followed by dropping of the head, a slight increase in depth and rate of respiration and then, about 60 seconds after injection (made into the left mammary vein), respirations slowed perceptibly. Probing still elicited a pedal reflex and a further 3 ml. dose was given.

The respiratory response was the same as before. Probing after a pause of about a minute indicated the absence of a pedal reflex, and the flint was removed within a few minutes without much trouble: the cavity left by the flint was filled with intramammary penicillin. After 10 to 15 minutes the animal showed signs of lifting her head, but was unable to do so unaided.

To increase the recovery rate 1·75 g. Megimide as a 10 per cent. solution in water were injected intravenously into the left jugular vein, taking about 15 seconds. A marked change was obvious before the injection was complete, and within a minute the animal was looking around, picking at her bedding and starting to chew. Ten minutes later she got up on three legs unaided and without encouragement, but was glad to support herself against the wall. One hour after injection of the Megimide the cow was lying comfortably on her brisket, taking an interest in her surroundings and picking at her bedding.

### Toxicity

No deleterious effects of either a local or general nature have followed the use of either pentobarbitone sodium or the bemegride solutions. Although the pentobarbitone solution has been injected perivascularly in appreciable quantities (Case 3) no local reaction has followed. Neither has a local reaction followed the use of the bemegride solution, but as extra-vascular leakage has not been known to occur, no conclusion can be drawn from this.

In upwards of 50 cases subjected to pentobarbitone sedation, 15 cases of narcosis in conjunction with chloral hydrate and 9 cases of anaesthesia using pentobarbitone sodium alone, no excitement and struggling attributable to either narcosis or fear have occurred.

A gross overdosage of bemegride was intentionally given to one animal which had been subjected to a 7 ml. sedative dose of pentobarbitone sodium (Case 2). The effects were insignificant and of no danger either to the animal or the attendants.

Milk yields and appetite after recovery from the anaesthetic have been excellent and no signs of systemic toxicity have been observed. In none of these cases was intubation carried out and no cases of regurgitation of ruminal contents occurred despite the lack of preparation.

### Discussion

Most veterinarians engaged in cattle practice will agree that the present methods of restraint and anaesthesia are neither universally applicable nor entirely satisfactory. Physical restraint is unsatisfactory for it allows continual movement and frequently prevents adequate examination and operation, nor is physical restraint always available on small farms, smallholdings, or late at night. Where anaesthesia is required, the large volumes and meticulous attention to intravenous technique required for chloral hydrate administration, and the systemic toxicity of that compound make it unsatisfactory; nor is it feasible to carry permanently the apparatus and anaesthetic necessary for emergency cases. Paravertebral techniques are specialised techniques not universally adopted and moreover take some time to perform.

The use of concentrated pentobarbitone sodium

(*Concluded at foot of adjoining column*)

*Note.* 1. All injections were followed by a delay of about 15 seconds before any reaction was observed.

2. The delay in disappearance of all signs of incoordination in Case 3 was most probably due to the continued absorption of the pentobarbitone deposited perivascularly.

# Haemonchosis in Nigerian Zebu Cattle: the Influence of Genetical Factors in Resistance

BY

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*SUMMARY.—In an investigation into poor post-weaning performance of White Fulani Zebu cattle at the Northern Region Agricultural Farm, Shika, near Zaria, Nigeria, evidence of genetically controlled resistance to haemonchosis in one bull line is demonstrated. The influence of resistance on faecal egg counts, blood values, serum protein values, and weight gains is described. The effects of inbreeding, environment, and age on resistance are discussed.*

## Introduction

THE role of genetical factors influencing resistance to disease in cattle has been reported in bacterial, virus, and protozoal diseases. In investigations with mastitis (Lush, 1950), foot-and-mouth disease (Prat, 1952), and trypanosomiasis (Stewart, 1951), the importance of genetically controlled resistance is stressed. In sheep there exists considerable evidence to support the theory of genetically controlled resistance to helminth infections. Whitlock, 1955, studying the heritability of resistance to trichostrongyle worm infections in sheep, found that differences between individuals or strains existed, rather than breed differences. Emik, 1949, in a similar study of trichostrongyle infestations in sheep, based on faecal egg counts over a 12-week period, estimated the heritability of resistance. Breed differences for males were found to be highly significant. The development of resistance by cattle to strongyle worm infestations has been well demonstrated by Roberts, O'Sullivan and Riek, 1952, and Riek, Roberts and O'Sullivan, 1953, and it would appear quite likely that this resistance, should in part at least, be heritable.

The present analysis is based on findings obtained during an investigation into poor performance of growing cattle from 6 to 18 months of age at the Shika Agricultural Department Farm near Zaria in the Northern Region of Nigeria, during the rainy season of 1957 (Lee, Ross & Peers, 1957).

## Materials and Methods

A preliminary survey carried out at Shika in January, 1957, suggested that parasitic gastro-enteritis might be of considerable importance. Consequently 5 experimental groups of 10 or 11 calves each, ranging in age from 4 to 10 months in March, 1957, were established. All calves were weaned in April. Three of these groups, which did not receive medicinal treatment for helminthiasis, are considered here. These are Group 1, the control, Group 3 which received mineral lick *ad lib.*, and Group 4 which received a protein supplement of ground nut cake at the rate of ½ lb. per head per day. The groups were randomised on weight and sex and were comprised of 7 or 8 White Fulani Zebu calves and 3 Sokoto Gudali Zebu calves each. They were housed in groups at night and grazed together throughout the day. All cattle were weighed weekly. In addition, the following monthly observations, which are relevant to this report, were made:—

1. Faecal egg counts from all individuals, by the technique of Roberts and O'Sullivan, 1950.
2. Larval differentiation from bulked faecal cultures from each group by the methods of Roberts and O'Sullivan, 1950, and Keith, 1953.
3. Packed cell volumes from all individuals, the oxalated blood being centrifuged at 3,500 r.p.m. for one hour.

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**The Uses of Concentrated Pentobarbitone Sodium Solution in Bovine Practice**—*Concluded.*

solutions, therefore, commends itself for the following reasons :—

1. The stable, sterile solutions are almost universally carried for small animal euthanasia.
2. The concentration makes it possible to achieve anaesthesia using a 20 ml. syringe and no special equipment is required (mask, gas cylinders or large syringes which are expensive to replace).
3. No skilled assistant and often no assistance at all is required.
4. The speed of induction and recovery far exceed any comparable methods.
5. The danger of toxicity is slight. Moreover, barbiturate narcosis or anaesthesia may be overcome at will by the use of bemegride.

*Acknowledgments* : I would like to thank Messrs. C. J. Hewlett and Son, Ltd., for their generous supplies of Trinaven, Messrs. A. G. Nicholas for making available quantities of Megimide Sodium and P. W. Daykin, B.SC., M.R.C.V.S., for his encouragement and assistance.

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In August and October paper electrophoresis analysis of serum proteins were made (Flynn & De Mayo, 1951). Strips of Whatman 3 mm. paper, 5 cm. x 33 cm. were suspended in a Shandon horizontal electrophoresis tank containing barbiturate buffer of *p*H 8.6 and ionic strength of 0.1. After saturation of the paper, serum (0.3 ml.) was applied and a current of 110 volts passed for 16 hours. The separated proteins on the paper were then fixed by heat coagulation and stained by Bromophenol blue after the method of Jencks, Jetton and Durrum (1955). The dyed strips were then soaked in transparency oil and scanned by a photo-electric densitometer. The intensity of the stained protein bands produces a typical pattern (Graph. 4) from which the percentage concentration of the protein fractions were calculated. Total serum nitrogen estimations were made by the Micro-Kehldal digestion technique and the total serum protein in g. per 100 ml. found by multiplying by the factor 6.25. Albumen and globin fractions in g. per 100 ml. were then calculated from the electrophoresis percentages.

### Course of Parasitic Gastro-enteritis Infection at Shika

From May onwards, the mean strongyle egg counts for the 3 groups rose steadily. Bulked grouped faecal larval cultures showed the infestation to consist of *Haemonchus contortus* 73 per cent., Oesophagostome spp. 5 per cent. and Cooperia spp. 22 per cent. By July and August the Haemonchus egg counts were well above the level generally recognised as pathogenically significant (Roberts, O'Sullivan and Riek, 1951) in the control and protein groups. In the mineral group, the mean of the group counts was 511 eggs per gm. which is considered as bordering on pathogenicity (Roberts, O'Sullivan and Riek, 1951). The pathogenic effect of the Haemonchus infection in the groups was reflected in the mean weight gains. From May to September, 1957, the weight gains were, Group 1, 17.4 lb., Group 3, 33.2 lb., and Group 4, 16.3 lb. The degree of haemonchosis was paralleled by a progressive anaemia as is demonstrated by the mean packed cell volumes which fell from 29.4 per cent. to 22.5 per cent. in Group 1 from May to September, from 29.0 per cent. to 25.8 per cent. in Group 3 and from 27.6 per cent. to 23.0 per cent. in Group 4. Outwith the differences in faecal egg count levels between the groups, the overall pattern of infection was the same, a sharp fall in the Haemonchus egg output occurring in August at the height of the rains.

### Genetical Variation

Within each group, individual animals were noticed to have consistently low Haemonchus faecal egg counts, coupled, in the high percentage of cases, with weight gains above the group mean. The individual resistance to Haemonchus infection, based mainly on faecal egg counts but also considering weight gains, was compared by using the following formula:—

$$\frac{E^2}{WX1{,}000} \times C = R$$

where E is the mean of the 4-monthly faecal egg counts from June to September.

W is the weight gain in lb. from May to October.

C is a correction factor which adjusts differences between the 3 groups due to the varying group treatments.

R is the Resistance Rating.

Correction factors were calculated by rating C in Group 1 as unity and dividing the mean resistance rating of Group 1 into the mean uncorrected resistance ratings of the other 2 groups. The calculated correction factors were Group 1, 1; Group 3, 4.1; Group 4, 3.7. The mean 4-monthly e.p.g. weight gains and resistance ratings for individuals in the groups are shown in Table I.

TABLE I
RESISTANCE RATING (R) OF INDIVIDUALS IN THE THREE GROUPS

| Group | Animal number | Mean 4 monthly E.P.G. | Weight gain lb. | Resistance rating |
|---|---|---|---|---|
| I | F 96 | 930 | 4 | 216 |
| | F 83 | 1,260 | 24 | 66 |
| | F 66 | 457 | 26 | 8 |
| C = 1 | F 54 | 1,050 | 34 | 32 |
| | F 92 | 1,977 | 25 | 156 |
| | F 65 | 432 | 37 | 5 |
| | F 78 | 585 | 28 | 12 |
| | F 79 | 960 | 40 | 23 |
| | Mean | 1,005 | 25 | 40 |
| 3 | F 72 | 900 | 32 | 102 |
| | F 68 | 492 | 29 | 32 |
| | F 77 | 567 | 31 | 41 |
| C = 4·1 | F 69 | 232 | 45 | 5 |
| | F 84 | 305 | 41 | 9 |
| | F 62 | 817 | 57 | 48 |
| | F 52 | 515 | 23 | 47 |
| | Mean | 565 | 33 | 40 |
| 4 | F 90 | 945 | Died | 100+ |
| | F 48 | 252 | 65 | 3 |
| | F 87 | 905 | 24 | 125 |
| C = 3·7 | F 73 | 782 | 16 | 140 |
| | F 97 | 560 | 42 | 27 |
| | F 58 | 505 | 74 | 12 |
| | F 80 | 537 | 68 | 15 |
| | F 76 | 640 | 57 | 26 |
| | Mean | 719 | 47 | 40 |

The 3 Sokoto Gudali were considered when the group means were calculated but not when the genetical variation was examined, hence the difference in the group mean values and the mean of the 7 or 8 White Fulani calves in each group. Examination of Table I shows that high resistant animals have a rating of 1 to 30, medium resistant animals, 30 to 50, and low resistant animals, 50 to 216.

In a survey of calves born at Shika between January, 1950 and August, 1953, Williams (1956), compared the performances of calves at varying levels of inbreeding. Calves having an inbreeding coefficient of less than 3.125 were classified as non-inbreds and those having inbreeding coefficients of 3.125 and over as inbreds. He found that the per-

centage mortality in non-inbreds was 18.8 per cent. while that in the inbreds was 33.9 per cent. The percentage mortality in the inbreds showed evidence of a positive correlation with increased homozygosity. It seemed likely that the high Haemonchus resistant rated calves might be expected to have low inbreeding coefficients. The inbreeding coefficients of the calves in the 3 groups were calculated (Wright, 1923) and the Haemonchus resistance rating compared with the coefficients of the individuals.

TABLE II
COMPARISON OF RESISTANCE RATING (R) AND INBREEDING COEFFICIENT (I.B.C.)

| | I.B.C. 0–1 per cent. | I.B.C. 1–3 per cent. | I.B.C. 3–5 per cent. | I.B.C. 5 per cent. |
|---|---|---|---|---|
| Number of cattle | 9 | 4 | 5 | 5 |
| Mean Resistance Rating | 70 | 47 | 25 | 61 |

As will be seen no apparent connexion exists between the degree of homozygosis and the resistance rating but the relatively high percentage of high and medium ratings between 1 and 5 per cent. inbreeding coefficient levels suggests the existence of a resistant line. To test this hypothesis, Tables III and IV compare resistance ratings on a sire and grandsire basis.

TABLE III
COMPARISON OF MEAN RESISTANCE RATINGS (R) OF SIRE LINES

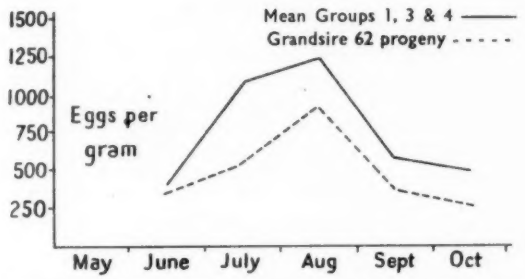
| | Sire 92 | Sire 95 | Sire 97 | Sire 96 | Other sires |
|---|---|---|---|---|---|
| Number of cattle | 6 | 7 | 3 | 3 | 4 |
| Mean Resistance Rating | 69 | 51 | 38 | 27 | 73 |

TABLE IV
COMPARISON OF MEAN RESISTANCE RATINGS (R) OF GRANDSIRE LINES

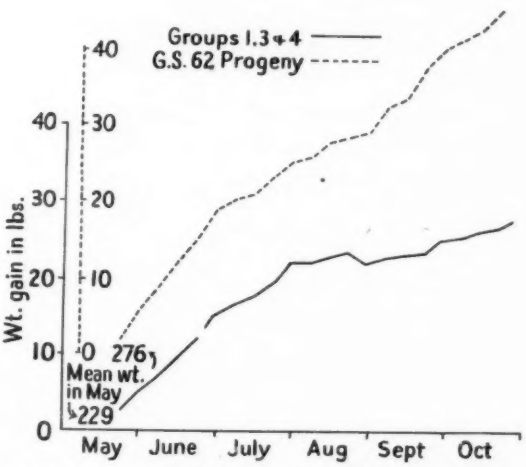
| | G.S. 60 | G.S. 59 | G.S. 70 | G.S. 62 | G.S. 61 | G.S. 66 |
|---|---|---|---|---|---|---|
| Number of cattle | 10 | 7 | 3 | 6 | 2 | 3 |
| Mean Resistance Rating | 47 | 64 | 38 | 18 | 38 | 12 |

Apart from the higher rating of sire 96 progeny, no association between sires and resistant rating is evident. The consistent occurrence of high resistant progeny from grandsires 62 and 66 is worthy of further consideration. As the sire of sire 96 was grandsire 62, it seems likely that the high progeny rating of sire 96 is due to the influence of grandsire 62. Two of the 3 high resistant progeny of grandsire 66 and 3 of the 4 high resistant progeny of grandsire 60, are also progeny of grandsire 62. A more searching analysis has therefore been restricted to the progeny of grandsire 62.

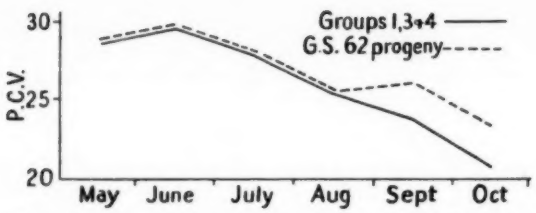
Before proceeding further with the examination of the alleged Haemonchus resistance in the grandsire 62 line it is necessary to consider whether the superior performance of the line is attributable to a specific resistance to haemonchosis or is merely part of an overall performance superiority. Five grandsires 62 and 60 progeny were present among the 21 calves in the 2 groups (Groups 2 and 5) which received regular monthly treatments with phenothiazine. As a result of the treatment, calves in these 2 groups showed low strongyle burdens, and may therefore be considered as being free from pathogenic Haemonchus burdens throughout the experiment. The mean weight gain of the 5 grandsires 62 and 60 progeny for the period May to October, 1957, was 39 lb. while that of the 16 other calves in the group was 43 lb. The existence of an overall superiority in performance is not substantiated and the hypothesis that the improved performance is a result of a specific resistance to haemonchosis in the lines is worthy of further




GRAPH 1.—Comparison of mean monthly strongyle eggs per gramme of Grandsire 62 progeny and Groups 1, 3, and 4.




GRAPH 2.—Comparison of 4 weekly moving average means of Grandsire 62 progeny and Groups 1, 3, and 4.




GRAPH 3.—Comparative packed cell volumes of Grandsire 62 progeny and Groups 1, 3, and 4 means.

consideration. A comparison of the monthly faecal egg counts, 4 weekly moving average weight gains, and monthly packed cell volumes of the progeny of grandsire 62 and the mean of cattle in the 3 groups is shown in Graphs 1, 2, and 3.

The consistently lower faecal eggs per gramme values and higher weight gains of grandsire 62 progeny is readily seen from the graphs. No significant difference in the degree of anaemia based on packed cell volume is evident and it is thought that other factors than parasitic gastroenteritis were operating to this end. The comparative faecal egg count pattern is of particular interest. While the grandsire 62 progeny eggs per gramme values are lower throughout, the overall pattern is the same, in that the sudden fall in egg output, suggesting self cure (Stoll, 1929), occurs in August, in both grandsire 62 progeny and the other cattle in the groups. This would suggest that the resistance results in a diminished egg output, or a lower comparative adult worm population, and does not materially affect the course of the disease. The relatively higher bodyweights of the grandsire 62 progeny at the start of the investigation in May would result in a higher faecal dilution of the worm eggs with a resultant lower count but on the other hand the higher food intake would subject these animals to a higher dose of infective larvae. The interpretation of the lower faecal egg counts as evidence of high resistance is thus still valid when considered in conjunction with weight gains, provided age resistance is not operating. The possible influence of age or resistance is considered in Table V but no association is evident.

TABLE V
COMPARISON OF AGE AND 4 MONTH MEAN FAECAL EGG COUNTS OF CATTLE IN GROUPS 1, 3 AND 4

| Age in April | 5 months | 6 months | 7 months | 8 and 9 months |
|---|---|---|---|---|
| Mean eggs per gm. | 1,120 | 640 | 390 | 810 |
| Standard deviation | 700 | 200 | 130 | 390 |

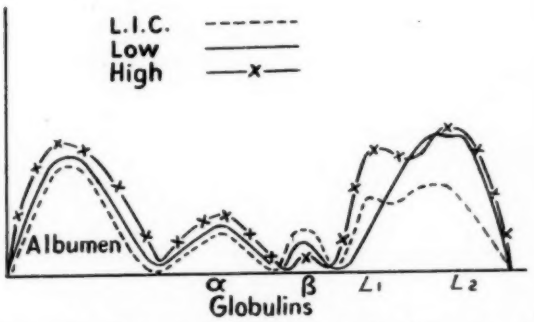
The lower faecal egg counts in the 6 and 7-month groups is due to the high percentage of grandsire 62 progeny in these groups.

### Serum Proteins

Two electrophoresis analysis of sera were done, one late in August and one in October. In August bulked sera samples of high and low resistant animals were analysed, and in October bulked sera samples of high-resistant, low-resistant, grandsire 62 progeny, Groups 1, 3, and 4, were analysed. August sample results are shown in Table VI, and October sample results in Table VII. A bulked sera sample from 6 normal healthy White Fulani Zebu cattle at Vom Livestock Investigation Centre, of equivalent ages, were analysed in August, and the results are included in both Tables for comparison.

Almost all Shika group serum albumen values are higher than the Vom cattle sample. This accounts for the Vom group albumen/globulin ratio not being considerably higher than the Shika group despite the relatively better condition of the Vom cattle. All Shika group $\alpha$ globulin values are higher than the Vom sample. Whether the increased albumen and globulin values have resulted from the disease syndrome or are environmental, has not been determined. In August both high and low resistant animals show an increased $\beta$ and $\gamma$ globulin. High resistance rating and good condition are positively correlated with a high albumen/globulin ratio in all samples except Groups 3 and 4. This anomaly is due to an increased $\beta$ and $\gamma$ globulin value in Group 3, and albumen value in Group 4, which reverse the correlation found in other groups between the albumen/globulin ratio and condition. The increased $\beta$ and $\gamma$ serum globulins in Group 3 appears to be associated with a resistance resulting in low egg per gramme counts, and improved weight gains, attributable to the mineral lick supplement, as the other 2 groups in the investigation which received phenothiazine treatment and had comparatively low worm burdens, showed a similar rise in $\beta$ and $\gamma$ globulins in October. The relatively high serum albumen value in Group 4, despite the poor condition, could feasibly be attributed to the protein supplement.

A comparison of the electrophoresis curves of the Shika high and low resistant group and the Vom cattle sera (Graph 4) indicate that the high resistant cattle tend to show an increase in the faster moving $\gamma 1$ fraction of the $\gamma$ globulin, while in the low resistant cattle sera the increase is more in the slower moving $\gamma 2$ fraction. Such differences were, however, not significant.




GRAPH 4.—Comparison of serum protein electrophoresis patterns of Livestock Investigation Centre normals and Shika high and low resistant calves.

TABLE VI

COMPARATIVE ELECTROPHORESIS ANALYSIS OF SERUM ALBUMEN AND GLOBULINS AUGUST 1957

| Serum sample | Albumen/ globulin ratio | Total protein g./100 ml. | Albumen | $\alpha$ globulin | $\beta$ and $\gamma$ globulin | Condition |
|---|---|---|---|---|---|---|
| Vom L.I.C. ... | 0·61 | 5·39 | 2·05 | 0·86 | 2·48 | Very good |
| High resistant ... | 0·59 | 6·62 | 2·45 | 1·06 | 3·11 | Good |
| Low resistant ... | 0·56 | 6·17 | 2·22 | 0·92 | 3·03 | Poor |

TABLE VII

COMPARATIVE ELECTROPHORESIS ANALYSIS OF SERUM ALBUMEN AND GLOBULINS OCTOBER, 1957

| Serum sample | Albumen/ globulin ratio | Total protein g./100 ml. | Albumen | $\alpha$ globulin | $\beta$ and $\gamma$ globulin | Condition |
|---|---|---|---|---|---|---|
| Vom L.I.C. ... | 0·61 | 5·39 | 2·05 | 0·86 | 2·48 | Very good |
| High resistant ... | 0·61 | 6·38 | 2·42 | 1·02 | 2·93 | Good |
| Low resistant ... | 0·49 | 5·81 | 1·92 | 1·28 | 2·61 | Poor |
| G. S. 62 progeny | 0·78 | 6·00 | 2·64 | 1·20 | 2·16 | Good |
| Group 1 control ... | 0·47 | 5·58 | 1·79 | 1·34 | 2·45 | Poor |
| Group 3 mineral ... | 0·52 | 6·64 | 2·26 | 1·33 | 3·05 | Fair |
| Group 4 protein ... | 0·59 | 6·88 | 2·54 | 1·44 | 2·89 | Poor |

The serum albumen variations which are largely responsible for the albumen/globulin ratio variations between groups appear worthy of further consideration, as a means of estimating the helminth resistance state of an animal when viewed in conjunction with faecal egg counts, bodyweight, and age.

## Discussion

The important question posed by the above evidence, is whether the heritable ability to perform better as demonstrated by the progeny of grandsire 62, is the result of a specific genetically controlled resistance to haemonchosis, or whether it is due to a heritable factor, or factors, operating on a wider sphere to permit of above average performance, and/or an overall disease resistance. The findings of Williams (1956), relating inbreeding depression to high mortality, tends to make the occurrence of an all-over disease resistant line at Shika unlikely. As all calves in the investigation were bucket fed, the possible genetical influence of a high yielding dam supplying a superior preweaning nutrition is eliminated. Prior to weaning, all calves were housed. Environmental variation, which would have differed considerably had the calves been on pasture, and might have markedly affected the relative intake of infective larvae prior to weaning, as a result of climate variation, would not be an important factor where the age variation was slight, and the calves were housed. This supposition and the absence of age resistance is supported by the lack of correlation between age and resistance rating. The higher average weight of the grandsire 62 progeny in April would suggest that they were "better doers" and that the resistance to haemonchosis was part of, or the result of, an overall performance superiority. The failure of the alleged Haemonchus resistant grandsire lives to perform better than average in the 2 groups (2 and 5) where haemonchosis was negligible, supports the hypothesis that the improved performance of the lines in Groups 1, 3 and 4, was due to a specific resistance to haemonchosis, and not the result of an overall performance superiority.

*Acknowledgements.*—We are extremely grateful to Mr. Rains, Mr. Simpson, Mr. Thorpe, and the staff of the Shika Agricultural Farm for their assistance during the investigation. We would also like to express thanks to Mr. Chambers, Adv. to Min. of Agric., Northern Region, Nigeria, for permission to use abstracts of Mr. Williams's report (Williams, 1956) and to Mr. Peers, Biochemist, Vom, for doing the total nitrogen determinations on the sera.

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# Veterinary Education in East Africa*

BY

A. M. HARTHOORN

VETERINARY training was established at Makerere College round about the year 1928, when a course was instituted at Entebbe. In 1946 this was moved to Kabete, where our clinical veterinary school is now. The School in its present form, began to take shape at the third meeting of the Board of Studies when the recommendations of Professor Wright were discussed. At this meeting the basic block of the Kabete Veterinary School, and the hostel were envisaged. The present Dean of the School took office in 1950 and a time of progress was embarked upon which has continued to this day. In 1951, plans were made to move the preclinical school back to Kampala, with the suggestion that part of the teaching should take place in conjunction with that of medical students. This move occurred soon after my own arrival in 1953. The only unfortunate aspect was that we were unable to complete our first series of new buildings until the beginning of the year 1958, a misfortune which may considerably hamper the improvement in the standard of teaching which we wish to achieve in the immediate future.

In a young country, the university lecturer has a heavy and responsible task. To the mind of the student in East Africa the impact of new ideas and learning is far greater than to his more sophisticated counterpart at home. New ideas, and facts from text-books alike may be taken as gospel truth and powers of discrimination may be lacking or not applied. Knowledge is the all-powerful weapon, the invincible magic sword that will assure position and wealth. All one has to do is to acquire it; once it has been acquired all need for effort is past. Thus the task of the tutor and teacher is as much to impart the sense of responsibility that knowledge demands, as to teach the facts themselves.

Veterinary science in Africa, much more noticeably than in Europe, seems to divide into two distinct forms. On the one hand we have our diagnostic clinic at Kabete near Nairobi, where animals get treatment comparable to any in the world in the early stages of their complaints. On the other hand we are fumbling in the twilight of little-known conditions in indigenous domestic animals in the field; their diagnosis and treatment further hampered by distance, communications, and the lack of facilities such as electric light and water.

The difficulties of general veterinary practice, and their reflection upon veterinary teaching in East Africa can also be roughly divided into two: the diseases brought about by intensification coupled with the hazards which accompany the importation of foreign methods of animal management followed by the health problems which accompany enclosure, even when it is possible—and how rare this is—to obtain a comparably higher standard of environmental sanitation. The recognition of the various diseases in this country; for few would deny that disease here, caused by organisms apparently identical with those found at home, takes on a different aspect from that which we are used to or which we find in our text-books.

Our peculiar problems may be the better appreciated by comparing the proportion of veterinarians to animals, and above all to distance, in various countries. In Britain there are 6 veterinary Schools and more than 6,000 veterinarians, that is, about one veterinarian for every 2,000 head of cattle (or 5,500 animals if we include sheep and pigs). In the U.S.A. this ratio is about one to 5,000. In East Africa the veterinarians number some 145, a considerable proportion of whom work in laboratories or in an administrative capacity. Cattle number some 17,313,000; or one veterinarian to more than 100,000 cattle; or if we include sheep and goats some 230,000 head of livestock. On a geographical basis there are, per veterinarian, from 1.6 thousand square miles in Uganda to 8.4 thousand square miles in Tanganyika.

At this time of visitations from England it may be pertinent to discuss our course and its examinations, and especially the comparison between a qualifying diploma on the one hand and a degree on the other. The immediate advantage of a diploma is that one can turn a large number of students into useful veterinarians more quickly. They may have not reached the standard required by the London University degree entry qualifications, but are of a good standard of intelligence and background, and with hard work make excellent field officers. A drawback to the veterinary diploma is that it is apparently more difficult to obtain that official recognition to which the medical licentiate has been looking forward and is now enjoying.

If we embark upon a degree course, we have the advantage of attracting to the veterinary profession those students who have passed their intermediate B.Sc. and who, up to now, have largely elected to continue their degree studies. On the other hand we might be narrowing our field considerably so that we should produce a smaller number of highly trained graduates a year rather than a much larger number of diplomates of sufficient training for the rather general work they are expected to do. In other words, we would be training specialists. It is questionable whether specialists are really required by a country that has as yet virtually no practitioners.

The exact nature of the degree that would be desirable at this college has as yet not been determined. Looking at it purely from the point of view of the good of veterinary activities in East Africa, it would, of course, be desirable to have one specially adapted, such as a veterinary degree in tropical medicine. This would enable us to add such essential teaching to our course as a study of heat

* Presidential Address (abridged) to the Uganda Division of the British Veterinary Association, April, 1958.

adaptation in cattle, thus replacing some of the conventional work which would have less application here.

There are certain special considerations affecting the education of a veterinary student in this part of the world. It can confidently be stated that large aspects of veterinary medicine, as yet unguessed at, will come to light, while many of the diseases at present encountered are very imperfectly described. Our primary task therefore, as long as we are allowed a certain amount of latitude, is to concentrate on a thorough grounding in the basic veterinary sciences, especially in comparative physiology. It is my belief that although all men make mistakes, those who have a thorough grasp of the basic workings of the body will be less likely to blunder than those who have learned the advanced part of the veterinary curriculum empirically, albeit thoroughly. This is the more so when the qualified man is going to be confronted continually with conditions which are barely, or not at all, described in his textbooks, and when the combined symptoms of the disease picture will not add up to anything which he has learned. A veterinarian who really knows how the body works is less likely to make a real mistake because he argues things out from basic principles. We are, therefore, trying to give a thorough grounding in such principles and to combine this teaching with constant practical work such as observations on normal cattle and on physiological aberrations such as are shown by the exotic cattle kept for research on various aspects of heat stress.

That is where I would like to leave this brief survey of veterinary education in East Africa lest our present progress should lead us to predict the future, and predicting the future lead us to speculation. It has been truly said, "*Ex Africa semper aliquid novi.*" But to a great extent the new things that come out of Africa will depend upon what we first put in.

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### TWINNING EXPERIMENT BEGUN

The MMB's trial on the production of twin calves from beef cows started last week in Montgomeryshire.

Forty-two farmers in the Caersws area are co-operating. More are being contacted. Dr. Ian Gordon of Cambridge, who is in charge of the trials, said: "The reaction of farmers is very favourable."

The experiment involves the injection of pregnant mare serum into cows three or four days before service.

Laboratory research at Cambridge has shown that if a cow is given such an injection she will, on average, produce twins.

The aim of the experiment is to see whether that result can be produced under farm conditions.

About 2,000 cows will be treated in the first year. At the present time, the emphasis is on beef production—and that is why this particular area of Wales was chosen, for a large amount of Hereford beef breeding is carried out there.

# Current Literature

## ABSTRACTS

**The Role of Pleuropneumonia-like Organisms in Infectious Sinusitis of Turkeys.** GRUMBLES, L. C., FLOWERS, A. I., & CASSIDDY, D. R. (1958). *Avian Diseases.* **2.** 336-47.

The authors regard pleuropneumonia-like organisms (P.P.L.O.) as the primary cause of infectious sinusitis of turkeys, although not all the strains examined could be shown to be pathogenic in this way. No evidence of virus infection was found in field cases.

**The Use of Erythromycin on Experimental Sinusitis of Turkeys.** HOLPER, J. C., BOWER, R. R. & SYLVESTER, J. C. (1958). *Avian Diseases.* **2.** 290-5.

A sinusitis was produced in young turkeys by inoculating their sinuses with pleuropneumonia-like-organisms (P.P.L.O.) originally isolated from chickens. This experimental sinusitis showed a complete clinical response to treatment with erythromycin, 50 mg. being injected into each sinus. No benefit was evident when the same drug was given intramuscularly (100 mg.) or when it was given in the food at the rate of 500 mg. per ton.

**The Use of Erythromycin in the Treatment of Infectious Turkey Sinusitis during a Natural Outbreak.** HAMDY, A. H., SANGER, V. L., & GALE, C. (1958). *Avian Diseases.* **2.** 250-7.

The authors describe an outbreak of infectious sinusitis in which some 20 per cent. of the flock showed swollen sinuses. Some showed respiratory distress. There was a 10 per cent. mortality rate.

Various dosages of erythromycin glucoheptonate were given to groups of 100 to 175 of the affected turkeys. When a single injection of 100 mg. was given into each sinus 88 per cent. of the birds recovered within 4 to 6 weeks. Injections of 75 and 50 mg. per sinus gave recovery rates of 63 and 60 per cent. respectively. There were corresponding decreases in the mortality rate.

The authors remark that the drug of choice may vary from one outbreak to another.

E. A. G.

**Traumatic Chylothorax in Small Animals, Treated by Ligation of the Thoracic Duct.** PATTERSON, D. F., & MUNSON, T. O. J.A.V.M.A. **133.** 9. 452.

The authors consider that traumatic rupture of the thoracic duct occurs more frequently in animals than is recognised, and consider the most frequent cause is violent hyperextension of the spine as occurs in street accidents. They base their diagnosis on: sudden dyspnoea, which may be delayed 2 to 10 days following injury, accompanied by signs of shock; dullness on chest auscultation, with a fluid line visible on a standing lateral radiograph; complete relief of the symptoms following thoracocentesis; reaccumulation of chyle and the recurrence of symptoms. Differential diagnosis in the early

stages must rule out pneumothorax, haemothorax and diaphragmatic rupture.

Conservative treatment aims at the prevention of the mechanical effects of chylothorax by limiting fluid intake, keeping on a low fat diet and repeated thoracocentesis. Maintenance of nutrition is achieved by a high carbohydrate-protein diet, maintenance of fluid balance, together with parenteral protein therapy. If this regimen proves unsatisfactory after 7 days, then the thoracic duct must be identified at thoracotomy, and ligated.

The authors quote from 4 cases which they have treated surgically, of which 2 were completely successful. R. G. W.

**Is Your X-ray Machine Dangerous?** KEALY, J. K. (1958). *Irish Vet. J.* **12.** 217.

Ionising radiation, of which X-ray is one type, is a health menace of the first order. The ill-effects of over-exposure to ionising radiation are manifold, ranging from burns on the skin to leukaemia, and even to long term genetic effects. Over-exposure to X-rays can be considered as a cumulative poison, in that damage will be produced whether the exposure is received in small doses repeatedly or in one massive dose. The biological actions of radiation are not yet clearly understood but there is no question as to the reality of the dangers—only the extent of the possible damage is arguable.

Anyone using X-rays must be aware of the dangers involved and take all possible steps to protect employees, contacts and himself. Machinery should only be bought from a reputable manufacturer and second-hand machines are best examined and tested by an expert. When in use no part of the human anatomy should be in the useful beam. Protective clothing should be worn and the exposure time kept to a minimum by the use of intensifying screens and fast films.

The use of fluoroscopy is to be discouraged. Visitors and unnecessary personnel should be excluded from the X-ray room and consideration must be given to the occupants of rooms in the immediate vicinity. If the tube head can be pointed in all directions then a primary barrier is necessary between the X-ray room and all occupied rooms adjoining it. If the movement of the tube head is restricted, then adjacent rooms should be surveyed for scattered or leakage radiation, and appropriate protective measures taken.

No considerations of expediency or false economy can justify failure to take necessary protective measures. Until legal standards of safety are prescribed the onus is on the operator of dangerous machines to see that he causes no harm to himself or to others. C.F.

## REPORTS

**Annual Report on the Veterinary Department of the Western Region of Nigeria for the Year 1955-6.**

Despite an acute shortage of qualified officers the year was one of steady sustained progress, reflected in an increase in the number of field inoculations and treatments carried out and also in more reports being received by field officers from all sections of stock-owners for advice on problems of livestock disease, husbandry, and nutrition. In view of the fact that the Department was short of a Senior Veterinary Officer and 5 out of 9 Veterinary Officers, as well as being approximately 50 per cent. under strength in Veterinary Assistants, this reflects much credit on the efforts of the Chief Veterinary Officer, Mr. H. K. Littlewood, M.R.C.V.S., and his small band.

*Animal Diseases*

As in the Northern Region, trypanosomiasis and rinderpest are diseases of major importance. Trypanosomiasis was recorded in cattle, sheep, goats, race-horses and ponies, dogs, and imported pigs. *T. vivax* was more frequently identified in cattle than *T. congolense*; the latter and *T. brucei* were seen in dogs and *T. simiae* in pigs. Antrycide methyl sulphate gave good results in clinical cases.

Rinderpest, responsible for 192 deaths, was reported in 3 Provinces. Three outbreaks occurred on Government stations in stock that had previously received lapinised rinderpest vaccine. Because the highly susceptible indigenous cattle of the Western Region react severely to the dried goat virus vaccine used elsewhere in Nigeria lapinised vaccine is in general use in the Western Region; nearly 19,000 head were vaccinated with it. To guarantee satisfactory immunity this vaccine must, however, be handled, transported, and administered in an adequate state of cold properly to maintain its viability—procedures which are not easy under the prevailing field conditions in the Region. An avianised virus vaccine tested failed to confer a wholly satisfactory immunity.

Some 34,800 vaccinations against bovine pleuropneumonia (1,900), black-quarter (10,800), haemorrhagic septicaemia (11,700), and anthrax (10,400) were carried out. Losses from these diseases were, however, low and in the case of pleuropneumonia no clinical cases at all were reported from the field. Helminthiasis causes considerable losses in some areas and seriously retards the development of young stock.

Rabies occurs sporadically throughout the Region; 10 cases, 9 in dogs and 1 in a cat, were confirmed. No information on the steps taken for control of the disease, other than that 237 vaccinations were made, is given in the Report. Babesiasis is common in dogs but readily responds to treatment.

Horses in the Region are confined almost entirely to one town (Ibadan). A brief note is given on a condition, known locally as "staggers," that is met with in horses. The aetiology of the condition, which is almost invariably fatal, has not yet been determined.

Fowl pox, fowl cholera, Newcastle disease, and fowl typhoid are prevalent throughout the country; 201,000 vaccinations against these diseases were carried out.

Six veterinary centres were maintained and were well patronised. It is encouraging to learn that 3 more and a veterinary diagnostic unit at Ibadan are also to be established.

*Livestock Improvement*

Good progress was made on the Western Regional

Production Development Board livestock ranch where foundation herds of Ndama and Keteku cattle and a cross-bred herd are kept under full ranching conditions. Importations of Ndama cattle were received from Sierra Leone and the Belgian Congo, and by the end of the year the herds totalled 253 head. Another herd of 660 Ndama cattle, originally founded in 1947 by importations from French Guinea, and a much smaller herd of Muturu (Dwarf Brachyceros) cattle were maintained at 2 other stations. These 2 breeds of cattle are noted for the high degree of tolerance they exhibit to trypanosomiasis.

An enterprising extension scheme, the outcome of which will be watched with interest, is planned at Shaki. In brief the scheme is one whereby a Government herd of Keteku cattle is to be managed under supervision by selected Fulani herdsmen, who will be remunerated by a share of the annual calf crop. It is hoped that the principles of sound breeding and husbandry demonstrated in this project will be emulated by other local herdsmen. Unfortunately an outbreak of rinderpest in the early stages of the scheme caused a severe setback and it is not clear from the Report whether it is yet in full swing.

*Animal Industries*

As the Western Region is not self-supplying in its meat needs relatively large imports of cattle, sheep, goats, and dried meat are received, mainly from the Northern Region; it is difficult, however, to reconcile the numbers quoted in the text of the Report with the actual slaughter figures in one of the appendices.

Progress in improving the standards of flaying and drying hides and skins was maintained; arsenication is practised throughout the Region and flaying knives and hammers are manufactured under Departmental supervision and distributed at nominal prices.

The Report concludes with 9 tables of statistics, not including, however, one of the livestock population. An inquisitive reader might feel that much more information could usefully have been included in the text of the Report to give a fuller picture of the livestock position in the Region; also that the treatment of almost every sentence as a separate numbered paragraph could well be dispensed with in future. Brevity is the soul of wit but not necessarily of Annual Reports.

W. E. L.

**Third Report of the Joint F.A.O./W.H.O. Expert Committee on Brucellosis**

The Committee met in Lima, Peru, from October 9th to 14th, 1957, under Dr. W. W. Spink as chairman and Dr. A. W. Stableforth as vice-chairman.

It was reported that since the previous meeting in Florence in 1952 considerable advances had been made in the knowledge of major aspects of brucellosis, particularly with regard to studies on the bacteriology of Brucella, diagnostic procedures in man and animals, therapy of human brucellosis, pathogenesis and vaccinal protection of goats and sheep. In the section dealing with routes of transmission from animals to man it is emphasised that cheese made from unpasteurised milk is an important source of infection for man in many areas of the world.

The use of antibiotics and chemotherapeutics in man is beneficial in reducing the clinical course of the disease with a reduction in the number of fatalities. It is pointed out, however, that all forms of antibiotic therapy and chemotherapy currently in use are merely suppressive of the infection.

There is no general agreement as to the place to which Brucella vaccine therapy and desensitisation are entitled in the treatment of the disease in man.

The Committee reaffirmed the views expressed in its previous reports on the diagnostic methods used in animals, emphasising the necessity for standardisation of various tests. The basic principles for combating brucellosis by control programmes as described in the first two reports are reaffirmed with emphasis on some of the more important points.

It was agreed that Strain 19 vaccine continues to hold its pre-eminent place among vaccines used in the control of bovine brucellosis. Additional information established that calfhood vaccination produced resistance to infection for at least 7 years, and moreover revaccination had little or no value.

The use of dried vaccines is discussed, and it is recommended that further studies be conducted to establish the relationship of viability of dried and reconstituted forms of vaccines to production methods, stabilisers and various temperatures.

In caprine brucellosis there is insufficient knowledge to make definite statements regarding the modes of transmission of the disease between goats. Available data suggests that the most probable route of infection is through the mucous membranes of the alimentary and respiratory tracts of the ewe.

Most infected goats excrete *Brucellosis melitensis* organisms in the milk. Contrary to previously published findings it has been shown that only some goats become chronic carriers of *Br. melitensis* for the duration of their lives; the majority recover from the disease. The interpretation of diagnostic tests for brucellosis in goats is discussed.

Vaccination of goats with Strain 19 vaccine does not induce adequate immunity but certain other vaccines may prove useful after further controlled trials have been carried out.

The pathogenesis of ovine brucellosis closely resembles that of the infection in goats. The same general considerations regarding diagnostic tests and vaccines apply to sheep as to goats.

Porcine brucellosis is very briefly mentioned and the committee regard research on diagnosis as of primary importance.

In the section dealing with the isolation of Brucella, the recommendations made in the first and second Reports are supplemented by further information on media, methods, animal inoculation and egg inoculation.

The committee considered that the work of the F.A.O./W.H.O. brucellosis centres has been of great value in promoting and co-ordinating efforts against brucellosis and expresses the hope that the co-operation of these centres will continue in the future.

# The Victoria Veterinary Benevolent Fund

A meeting of the Council of the Fund was held at 10, Red Lion Square, London, W.C.1, on November 13th, 1958, when the following members were present:—

Mr. H. W. Dawes (President) in the chair, Professor T. J. Bosworth, Messrs. H. E. Bywater, E. Clark, Major J. J. Dunlop, Mr. R. C. U. Fisher, Mrs. Daisy I. Glover, Messrs. J. M. Ingram, A. A. Lamont, Mrs. Erica B. Thomson, Miss V. Tillemont-Thomason, Captain W. Watt, and Major W. H. Wortley. Mr. C. W. Francis, secretary, was in attendance.

*Welcome to New Members*

The President extended a warm welcome to Mrs. Thomson, newly elected President of the Ladies' Guild, and to Mr. H. E. Bywater, nominated by the Central Veterinary Society to succeed Miss O. Uvarov.

*Minutes*

The Minutes of the previous meeting, held on July 9th, 1958, having been published in THE VETERINARY RECORD, were taken as read and signed as correct.

*Obituary*

The President reported with great regret the death of Sir John Kelland, which took place on September 24th last. He referred to the invaluable services rendered by Sir John to the Fund, particularly during the years 1916 to 1927, when he held the offices of Hon. Secretary and Hon. Treasurer. The President then moved from the chair:—

That a letter of condolence be sent to Lady Kelland and family, expressing the Council's sincere sympathy in the great bereavement they had sustained.

*Apologies for Absence*

The secretary reported apologies for absence from Messrs. G. Atkinson, E. P. Barrett, J. A. Flynn, G. N. Gould, Professor J. McCunn, Captain J. McKinna, Professors A. Messervy and L. P. Pugh, Mr. W. J. B. Robson, Major C. W. Townsend, Professor W. L. Weipers, Captain A. Whicher, and Dr. W. R. Wooldridge.

*Correspondence*

The secretary submitted correspondence from:—

(i) Mrs. D. I. Glover of September 26th, enclosing the sum of £1,200, collected by the Ladies' Guild during the jubilee year, to be apportioned as to £800 for current relief and £400 for the Special Gift Account.

The meeting paid warm tribute to the members of the Ladies' Guild for this magnificent sum and unanimously resolved that a letter be sent to the hon. treasurer conveying the Council's grateful thanks for the Guild's continued generous support of the Fund.

(ii) Messrs. Watson & Peck, Solicitors, dated July 31st, stating that the late Mr. A. S. Brooksbanks, M.R.C.V.S., had bequeathed to the Fund a legacy of £250.

(iii) Editor of THE VETERINARY RECORD, enclosing cheque for £12 10s., being half of the cash prize of the British Veterinary Association's William Hunting Award, which Mr. John Birrell, M.R.C.V.S., had requested be paid to the Fund.

*It was unanimously resolved*

(a) That a letter be sent to Mr. Birrell, expressing the Council's appreciation and thanks for this handsome donation, and

(b) That he be elected a life member of the Fund.

*Accountant's Report*

The following report was read and approved, a hearty vote of thanks being accorded to the respective donors.

Since the previous meeting the following special subscriptions and donations have been received:—

| | £ s. d. | £ s. d. | £ s. d. |
|---|---|---|---|
| *Subscriptions* | | | |
| V.V.B.F. Ladies' Guild (for current relief) ... ... ... ... | | 800 0 0 | |
| Income Tax recovered on covenants | | 76 10 6 | |
| | | | 876 10 6 |
| *Donations* | | | |
| Birrell, John ... ... ... ... | | 12 10 0 | |
| Bracewell, C. D. ... ... ... | | 1 0 0 | |
| Cameron, John (Bath) ... ... | | 10 10 | |
| McQuaker, J. ... ... ... ... | | 9 9 | |
| Owen, R. H. ... ... ... ... | | 2 10 0 | |
| Lancashire Veterinary Association | | 10 0 0 | |
| Lincolnshire and District Division | | 5 0 0 | |
| Tench, A. H. ... ... ... ... | | 11 11 | |
| British Timken Show ... ... | | 1 1 0 | |
| Chiddingfold Farmers' Pony Club Show ... ... ... ... | | 1 1 0 | |
| Cranleigh and W. Surrey Farming Club Show ... ... ... ... | | 2 2 0 | |
| Dagenham Dog Show ... ... | | 3 3 0 | |
| Dane of the Year Show ... ... | | 2 2 0 | |
| Windsor Championship Show ... | | 10 10 0 | |
| Yorkshire Cocker Spaniel Club Show | | 10 6 | |
| | | | 53 2 0 |
| *Collecting Boxes* | | | |
| Ayrshire Veterinary Association | | 1 1 0 | |
| Herts. and Beds. Veterinary Society | | 10 0 0 | |
| Mid-West Veterinary Association ... | | 13 9 2 | |
| Scottish Metropolitan Division ... ... ... | 3 5 0 | | |
| | 4 6 0 | | |
| | | 7 11 0 | |
| Welsh Branch ... ... | 1 15 7 | | |
| | 1 7 4 | | |
| | | 3 2 11 | |
| Western Counties Veterinary Association ... ... ... ... | | 3 15 9 | |
| Whicher, A. ... ... ... ... | | 3 5 9 | |
| Yorkshire Division ... ... ... | | 8 8 0 | |
| | | | 50 13 7 |
| | | | £980 6 1 |

*Subscription by Covenant*

A new covenant for a subscription of £2 2s. has been received from Mr. A. Steele-Bodger, M.R.C.V.S.

*Summer Gifts*

The secretary reported that the executive committee, with the assistance of the treasurer of the Ladies' Guild, had agreed on special gifts amounting to £311 being allocated to 39 recipients of the Fund, and that

these gifts were despatched on June 30th, 1958:—

*It was resolved* that the action of the executive committee in sending out gifts in June, 1958, amounting in all to £311, as detailed in the list submitted to this meeting, be, and the same is hereby, approved.

*Cases*

No. 52, aged 80. Suffers from arthritis. A report from a member of the Ladies' Guild on her visit to this case on November 2nd, having been read, *it was resolved*

That the present grant of £2 10s. per week be not disturbed.

No. 269, daughter of late member. The secretary reported that this recipient died on September 14th, 1958.

No. 280, widow, aged 68. One son, married and an invalid. The action of the executive committee in making a special grant of £20 to pay off her coal and other debts, was approved.

No. 289, two daughters of late member, ages 62 and 54. The secretary reported that the executive committee, on the authority granted to it at the July Council meeting, had made a grant of 10s. 6d. per week in this case, effective as from August 1st. This decision was made as the National Assistance Board in July decided to assist these daughters with a combined grant of £5 16s. per week. *It was resolved*

That the action of the executive committee be confirmed.

No. 294, daughter of late member, aged 60. A verbal report by a member of Council on her visit to this recipient on July 22nd, having been made to the Council, *it was resolved*

That the present grant of £2 per week be continued until the next meeting when her case be further considered in the light of additional information to be obtained, in the meantime, by the secretary.

No. 295, widow, aged 43. One daughter, aged 8, now at the Caledonian Schools at Bushey. In view of the report of the executive committee on this case, the Council confirmed its action in extending the grant of £3 per week until the end of October, 1958. The Council further agreed to continue its assistance to this recipient until the October/November, 1959, meeting, but that the grant of £3 per week be reduced to £2 per week as from January 1st, 1959.

No. 304, M.R.C.V.S., aged 59. Ill-health. The action of the executive committee in extending the grant of £2 per week for the month of October, was confirmed. After consideration of a further application and a report from a local member *it was resolved*

That the grant be continued until the April, 1959, meeting.

No. 324, widow, aged 65. Case reviewed. *It was resolved*

That the present grant of £2 per week be continued until the end of December when it be reduced to 30s. per week; and that the case be reviewed again in 12 months' time.

No. 326, M.R.C.V.S., aged 32. Three children, aged 8, 5, and 1½. The Secretary reported that the grant in this case had now been discontinued as the recipient had been pleased to report that he was sufficiently well to resume practising his profession. A letter expressing his grateful thanks for the help he received from the Fund during his illness was read to the meeting.

No. 327, widow, aged 34. Seven children between the ages of 10 years and 14 months. The secretary having submitted correspondence received from 2 local members of the profession on this case, *it was resolved*

That no further action be taken in this case for the time being.

No. 320, husband died in April, 1958. Widow admitted into hospital in July with broken thigh. The action of the executive committee in renewing the grant of £2 per month, formerly paid to her late husband, and making a special contribution of £5 towards his funeral expenses, was approved. *The meeting further agreed*

(a) That the grant be continued;

(b) That the secretary be instructed to ask a lady member of the profession to visit this case and submit a report for the next meeting.

No. 322, M.R.C.V.S., aged 68. A member of Council having raised the question whether in view of the recipient's present disability the grant of 30s. per week now being paid to her was adequate, the meeting reviewed this case and agreed, subject to the V.M.A. of Ireland Scrutinising Committee concurring, to increase it to £2 10s. per week as from January 1st, 1959.

No. 328, widow, aged 54. Three sons, aged 29, 26, and 10; two daughters, 27 and 13 (the latter suffering from tuberculosis). This case, having been referred to the executive committee at the previous meeting, the committee reported that in view of further information received from applicant, it was agreed to make her a grant of 30s. per week commencing from July 1st, for a period of 12 months. The Council approved the action taken.

No. 330, widow, aged 81. (Daughter of late member.) Applicant has one daughter, aged 50, who occasionally helps her to buy clothes. Living on her small savings. Had to vacate her flat on October 13th, and now living at a temporary address. Application made for financial assistance as she is anxious to settle in "The George Edward Smart's Homes" recently built for old people. In view of the urgency of this case, and it being understood the cost per resident will amount to £5 5s. per week the executive committee decided on a temporary grant of £3 3s. per week to be effective as from October 1st.

*It was resolved* that the action of the executive committee be confirmed, and that the grant be continued.

No. 331, widow, aged 34. Husband, captain in the Irish army, died on April 26th, 1958. Five children, ages 10, 8, 6, 4, and 1½ years. Total income: £224 from pensions from the Irish army for the widow and children. Case presented by the V.M.A. of Ireland Scrutinising Committee, who recommend a grant of £1 per week.

*It was resolved* that the recommendation of the Scrutinising Committee be adopted.

*Date of Next Meeting*

It was agreed that the date of the next meeting be left in the hands of the executive committee.

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## THE SOMERSET CATTLE BREEDING CENTRE

Following a luncheon held last week in Ilminster Sir William Gavin unveiled a plaque to commemorate the work of the founder-members of the advisory committee of the Centre. In the course of a speech, Mr. Roy Cary, county chairman of the N.F.U., paid tribute to the pioneer work in artificial insemination carried out by the Centre and referred to the veterinary services which, he said, were second to none.

Performing the unveiling ceremony Sir William Gavin referred to the 13 years' work of the Centre and said that confidence in it had been amply justified. More than 100,000 cattle had been inseminated in the past 12 months.

## THE SHARE-JONES LECTURES

The late Professor Share-Jones bequeathed a sum of money to endow annual lectures on a subject bearing on Animal Husbandry, and two lectures are announced so far for 1959. The first will be delivered by Sir William Slater, K.B.E., F.R.S., Secretary to the Agricultural Research Council, in the Powys Hall, University College of North Wales, Bangor, on Monday, January 12th, at 8.15 p.m. The subject will be "Animal Husbandry—the Present and the Future." The second lecture will be delivered on February 23nd and we shall publish further details at a later date.

Admission is free and without ticket, and it is hoped that as many members of the profession as possible will attend the lectures.

# News and Comment

## THE QUEEN TO OPEN R.V.C. FIELD STATION

It has just been announced that the Queen has graciously consented to open formally the newly established Field Station of the Royal Veterinary College at Potter's Bar. The ceremony will take place on April 20th.

An account of the new Field Station was published in THE VETERINARY RECORD on December 20th, 1958.

## NEW SLAUGHTERHOUSES REGULATIONS

In connection with the Slaughterhouses Act of 1958, two sets of Regulations came into force on January 1st. We are indebted to an expert correspondent for the following notes.

*The Slaughterhouse (Hygiene) Regulations, 1958*

The above Regulations, made jointly by the Ministers of Health and Agriculture, Fisheries and Food under the Food and Drug Act, 1955, and the Slaughterhouses Act, 1958, came into force on New Year's Day.

They prescribe the hygienic requirements in respect of construction, layout and equipment of slaughterhouses and the practices to be observed in them. Amongst the latter is a prohibition on the use of tobacco (including snuff) in any part of a slaughterhouse containing meat or blood.

In addition to certain sanitary provisions, the recommendations contained in Memo 3/Meat with regard to casualty animals and carcases are now made legal requirements. No undressed carcase (except that of an ovine animal) shall be brought into a slaughterhouse unless accompanied by a veterinary certificate stating the reason for slaughter, whether the animal was affected with any disease liable to render the meat unfit for human food, and particulars of any drugs administered to the live animal which might affect the meat. The undressed carcase of a sheep or lamb may be admitted with a written declaration by the owner stating that the animal had not recently been treated by a veterinary surgeon, together with reason for slaughter and any drugs or medicines recently administered.

No dressed carcase shall be brought into a slaughterhouse unless accompanied by a certificate issued by an authorised meat inspector to the effect that it is fit for human food, or unless it is accompanied by its offal (including the stomach and intestines where practicable) and a veterinary certificate as detailed above.

Penalties for offences are fines not exceeding £100, with or without imprisonment up to 3 months and, in addition, a fine not exceeding £5 per day for continuing offences. A slaughterhouse licence may be cancelled if the licensee is convicted of an offence against these Regulations.

*Slaughter of Animals (Prevention of Cruelty) Regulations, 1958*

These Regulations, made by the Minister of Agriculture, came into force on January 1st, 1959. They re-enact and extend the Slaughter of Animals (Prevention of Cruelty) Regulations (No. 2) 1954 and the amending Regulations of 1955.

Lairages must be suitably constructed and have adequate feeding and watering facilities. Drinking water must be available to animals at all times and they must be fed twice daily except on the morning of the day of intended slaughter or the afternoon preceding it. In the case of horses, they must always be fed on the afternoon preceding day of intended slaughter.

Horned and fractious animals must be separated from other stock and, if two such animals are kept together, they must be restrained so as to prevent injury to one another. Animals must not be kept in fields awaiting slaughter when weather conditions are likely to cause suffering.

No animal may be slaughtered in a slaughterhouse or knackery in the sight of another animal. If, however (except only in the case of horses), structural alterations are necessary to comply with this requirement in slaughterhouses constructed befor July 1st, 1955, then this provision may be delayed until a date to be fixed by the Minister.

Ill or disabled animals must be isolated, unless immediate slaughter is necessary, and animals may be slaughtered in the lairages if movement causes suffering.

Young animals, unable to take swill or solid food, are to be slaughtered as soon as practicable.

The initial granting of a slaughterman's licence may be contingent upon the licensee working under the direct supervision of a competent licensed slaughterman.

No horse delivered to a knacker's yard shall be worked and all animals must be slaughtered within 48 hours of delivery. No person under the age of 15 years shall be present in a knacker's yard whilst slaughtering or cutting of carcases is in progress.

Stunning pens must be provided for adult cattle, unless the local authority issues a certificate of exemption in respect of existing slaughterhouses where this requirement cannot be complied with owing to restricted accommodation or other special circumstances. No such certificate shall have effect after January 1st, 1963. Owners may appeal to a court of summary jurisdiction against refusal to grant certificates of exemption.

Separate rooms or bays shall be provided for the slaughter of horses in slaughterhouses and knackeries, except in the case of "existing slaughterhouses" when this provision shall not apply until the Minister shall so order and, in the case of a knackery constructed before December 2nd, 1954, not until January 1st, 1960.

Penalties for infringements are fines not exceeding £50 with or without imprisonment up to 3 months. It is provided that a person shall not be guilty of an offence if he proves that by reason of an accident or other emergency the contravention was necessary for preventing physical injury or suffering to any person or animal.

## THE NEW YEAR HONOURS

Members of the profession, and others whose work is associated with it, were honoured by the Queen in the New Year List, as follows:—

Mr. E. T. Joseph, deputy veterinary officer, Singapore (M.B.E.); Miss Margaret G. Keats, veterinary surgeon of the Kerang District of Victoria, Australia (M.B.E.); Dr. M. S. Reichert, deputy Director of Veterinary Services, Bechuanaland (M.B.E.); Mr. I. J. Cunningham, superintendent of the Animal Research Station, Wallaceville, New Zealand (C.B.E.); Sir James Turner, President of the N.F.U. (Barony); The Rev. C. L. Cusswell, C.V.O., Chaplain to the R.C.V.S. (K.C.V.O.); Mr. M. Campbell, secretary to the Department of Agriculture, Scotland (C.B.); Sir George Wilson, chairman of the Governors, West of Scotland Agricultural College (K.B.E.); Professor S. J. Watson, professor of Agriculture and Rural Economy, University of Edinburgh (C.B.E.); Mr. Anthony Hurd, M.P., lately Agricultural Correspondent of *The Times* (Knight); Mr. I. de B. Daly, lately Director of the Institute of Animal Physiology, Babraham, Cambridge; Mr. R. C. G. Nisbet, lately Assistant Secretary, Department of Agriculture for Scotland, and Mr. C. P. Quick, Assistant Secretary, Ministry of Agriculture (Cs.B.E.); Mr. T. P. Lecky, Director of Animal Husbandry, Jamaica (O.B.E.); Mr. G. S. Peren, Principal of Massey Agricultural College (K.B.E.); Mr. J. M. Hay, senior principal scientific officer, Ministry of Agriculture (O.B.E.); Mr. G. H. Argent, higher executive officer, Ministry of Agriculture; Mr. C. O. G. Cosson, experimental officer, Ministry of Agriculture; Mr. A. Thompson, poultry advisory officer, N.A.A.S.; Mr. W. H. Williamson, senior trade officer, Ministry of Agriculture; and Mr. E. C. Wood, higher executive officer, Ministry of Agriculture (Ms.B.E.).

## R.C.V.S. OBITUARY

We record with regret the deaths of the following members of the profession:—

LLEWELLIN-EVANS, Tom Geoffrey, of 45, Southgate Street, Winchester, Hants. Graduated London, December 10th, 1938. Died December 15th, 1958, aged 59 years.

SMITH, Robert McDill, of Thornwood, Galston, Ayrshire. Graduated Glasgow, July 16th, 1921; died January 5th, 1959.

WYNNE, John Henry (F.R.C.V.S., retd.), of Vaynol, Denbigh. Died December 20th, 1958, aged 90 years.

## PERSONAL

### Marriage

STRATTON—PEARSON.—On December 27th, 1958, at St. Andrew's, Tye Green, Harlow, John Stratton, M.R.C.V.S., to Julia Margaret Pearson.

### Birth

MARTIN.—On December 31st, 1958, at Aberdeen Maternity Hospital, Forresterhill, to Evelyn, wife of James A. Martin, B.V.M.S., M.R.C.V.S., 44, Morningside Avenue, Aberdeen, a daughter, Karen Evelyn.

## COMING EVENTS

### January

16th (Fri.). Annual General Meeting of the Mid-West Veterinary Association at the Berkeley Café, Clifton, Bristol, 2.15 p.m.

General Meeting of the North of England Veterinary Medical Association in the Durham School of Agriculture, Houghall, Durham, 2.30 p.m.

21st (Wed.) 10th Anniversary Dinner-Dance of the Centaur Society at the Berkeley, Bristol.

Meeting of the Warwickshire Veterinary Club in the Regent Hotel, Leamington Spa, 8 p.m.

28th (Wed.). Winter Meeting of the North of Scotland Division in the Marcliffe Hotel, Aberdeen, 2.30 p.m.

General Meeting of the Southern Counties Veterinary Society in the Grand Hotel, Bournemouth, 7.45 p.m.

30th (Fri.). Annual Ball of the Royal (Dick) School of Veterinary Studies in the Assembly Rooms, George Street, Edinburgh, 9 p.m.

Annual General Meeting of the Yorkshire Veterinary Society in the Hotel Metropole, Leeds, 1, 2.30 p.m.

### February

11th (Wed.). Annual General Meeting of the Society for the Study of Animal Breeding at the Royal Society of Medicine, 1, Wimpole Street, W.1.

## BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS IN JANUARY

**Tuesday, January 20th, 1959—At No. 7, Mansfield Street**

5.30 p.m. Finance Sub-committee.

**Wednesday, January 21st, 1959—At No. 7, Mansfield Street**

10.00 a.m. Veterinary State Medicine Committee.
11.30 a.m. Home Appointments Committee.
2.00 p.m. Small Animals Committee.

**Thursday, January 22nd, 1959—At No. 7, Mansfield Street**

10.00 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Farm Livestock Committee.
2.15 p.m. General Purposes and Finance Committee.

**Friday, January 23rd, 1959—At The Connaught Rooms, Gt. Queen Street, W.C.2**

11.00 a.m. Council Meeting.

## AREA ERADICATION PLAN FOR TUBERCULOSIS
### Statement Showing the Position at October 1st, 1958

| | Total cattle on June 4th, 1958 (provisional figures) ('000) | Number of registered attested herds | Total attested cattle ('000) | Percentage of total cattle |
|---|---|---|---|---|
| GREAT BRITAIN | 10,014 | 202,138 | 8,231 | 82 |
| England & Wales | 8,196 | 158,807 | 6,481 | 79 |
| England | 7,091 | 120,724 | 5,435 | 77 |
| Wales | 1,105 | 38,083 | 1,046 | 95 |
| Scotland | 1,818 | 43,331 | 1,750 | 96 |

1.—COUNTIES WITHIN ATTESTED AREAS—IN WHICH IT IS ASSUMED ALL THE CATTLE ARE ATTESTED

| | Total cattle on June 4th, 1958 (provisional figures) ('000) | | Total cattle on June 4th, 1958 (provisional figures) ('000) |
|---|---|---|---|
| ENGLAND | | SCOTLAND | |
| Berkshire | 92 | Argyll | 69 |
| Cumberland | 270 | Ayr | 169 |
| Dorset | 180 | Berwick | 39 |
| Isle of Scilly | 1 | Bute | 13 |
| Southampton | 167 | Caithness | 30 |
| Isle of Wight | 26 | Clackmannan | 6 |
| Kent | 125 | Dumfries | 123 |
| Somerset | 347 | Dunbarton | 19 |
| Surrey | 61 | East Lothian | 18 |
| Sussex East | 115 | Fife | 76 |
| Sussex West | 84 | Inverness | 54 |
| Westmorland | 111 | Kinross | 12 |
| Wiltshire | 216 | Kirkcudbright | 88 |
| | | Lanark | 103 |
| | | Midlothian | 28 |
| | | Moray | 36 |
| | | Nairn | 10 |
| | | Orkney | 55 |
| WALES | | Peebles | 14 |
| | | Perth | 111 |
| Anglesey | 66 | Renfrew | 33 |
| Brecon | 56 | Ross-shire | 45 |
| Caernarvon | 66 | Roxburgh | 42 |
| Cardigan | 93 | Selkirk | 9 |
| Carmarthen | 164 | Stirling | 51 |
| Merioneth | 41 | Sutherland | 11 |
| Montgomery | 114 | West Lothian | 18 |
| Pembroke | 127 | Wigtown | 86 |
| Radnor | 46 | Zetland | 6 |

2.—COUNTIES OUTSIDE ATTESTED AREAS

| | Total cattle on June 4th, 1958 (provisional figures) ('000) | Number of registered attested herds | Total attested cattle ('000) | Percentage of total cattle |
|---|---|---|---|---|
| ENGLAND | | | | |
| †Bedford | 40 | 620 | 31 | 78 |
| *†Bucks | 118 | 1,792 | 93 | 79 |
| †Cambridge | 29 | 494 | 22 | 76 |
| ‡Isle of Ely | 18 | 136 | 6 | 33 |
| ‡Cheshire | 240 | 3,804 | 169 | 70 |
| †Cornwall | 292 | 6,930 | 209 | 72 |
| ‡Derby | 182 | 2,452 | 108 | 59 |
| *†Devon | 457 | 10,607 | 380 | 83 |
| *†‡Durham | 126 | 2,506 | 95 | 75 |
| †Essex | 122 | 1,921 | 98 | 80 |
| †Gloucester | 207 | 3,421 | 170 | 82 |
| †Hereford | 161 | 4,052 | 141 | 88 |
| †Hertford | 60 | 890 | 50 | 83 |
| ‡Huntington | 29 | 236 | 13 | 45 |

2.—COUNTIES OUTSIDE ATTESTED AREAS

| | Total cattle on June 4th ,1958 (provisional figures) ('000) | Number of registered attested herds | Total attested cattle ('000) | Percentage of total cattle |
|---|---|---|---|---|
| *†‡Lancashire | 285 | 5,856 | 222 | 78 |
| ‡Leicester | 171 | 1,596 | 83 | 49 |
| ‡Lincoln—Holland | 27 | 152 | 6 | 22 |
| ‡ Kesteven | 73 | 555 | 32 | 44 |
| ‡ Lindsey | 163 | 1,270 | 66 | 40 |
| †Middlesex | 7 | 115 | 5 | 71 |
| †Norfolk | 187 | 1,956 | 128 | 68 |
| ††Northampton | 155 | 1,241 | 74 | 48 |
| ‡Soke of Peterboro' | 8 | 53 | 4 | 50 |
| ‡Northumberland | 223 | 2,076 | 121 | 54 |
| ‡Nottingham | 109 | 1,208 | 59 | 54 |
| *†Oxford | 111 | 1,812 | 96 | 86 |
| ‡Rutland | 22 | 108 | 7 | 32 |
| †Shropshire | 299 | 5,767 | 246 | 82 |
| ‡Stafford | 234 | 3,177 | 140 | 60 |
| †Suffolk East / †Suffolk West | 126 | 2,072 | 103 | 82 |
| ††Warwicks | 149 | 1,873 | 96 | 64 |
| †Worcester | 105 | 1,509 | 65 | 62 |
| ‡Yorks—East Riding | 142 | 1,144 | 54 | 38 |
| *†‡ North Riding | 277 | 5,420 | 199 | 72 |
| *†‡ West Riding | 342 | 7,224 | 249 | 73 |
| WALES | | | | |
| *† Denbigh | 112 | 3,486 | 97 | 87 |
| †Flint | 63 | 1,691 | 50 | 79 |
| *†Glamorgan | 79 | 2,381 | 61 | 77 |
| †Monmouth | 78 | 2,201 | 65 | 83 |
| SCOTLAND | | | | |
| †Aberdeen | 256 | 5,869 | 214 | 84 |
| †Angus | 75 | 1,093 | 64 | 85 |
| *†Banff | 68 | 1,561 | 62 | 91 |
| †Kincardine | 45 | 763 | 36 | 80 |

* Parts of these counties are in Attested Areas.

† Counties or parts of counties where free-testing facilities have been available since March 1st, 1957.

‡ Counties or parts of counties where free-testing facilities have been available since March 1st, 1958.

*Note:* In Part 2 the numbers of Attested Cattle and the derived percentage from counties in England and Wales are estimated figures.

## MAJOR T. G. LLEWELLIN-EVANS

Mr. A. W. Smith writes:—

Geoff. Llewellin-Evans's many friends and colleagues were shocked to learn of his sudden death on the afternoon of December 15th. On that morning he had set out on a round of duties, in the best of spirits and enjoying the satisfaction of a new car purchased only two days previously. He had also been looking forward to a spell of leave over Christmas and the New Year to be spent with a sister in South Wales. In the late afternoon he was found in his car, at the side of a farm road.

Geoff. joined the Indian Army in 1918, serving in the cavalry and reaching the rank of captain before leaving in 1923. After his return to this country he went out to the Northern Transvaal where he was engaged in farming until 1931. In the following year he returned and, entering the Royal Veterinary Col-

lege, qualified in December 1938. After spending a period as veterinary surgeon to the greyhound racing stadium at Wandsworth, he was called up from the reserve of officers in 1940. Serving in the R.A. until 1943, when he was transferred to the R.A.V.C., he was at first captain, then major and D.A.D.V.S. stationed at New Delhi and Simla. After his demobilisation in 1946 he worked as temporary veterinary inspector in the Animal Health Division, on foot-and-mouth and fowl pest duties. In July, 1950, he was appointed a whole-time veterinary officer.

Always quiet, unassuming, and courteous, Geoff. endeared himself to all his colleagues. He was liked and respected by all with whom he came in contact, not least for the understanding and consideration for others which were so characteristic of him.

The funeral, held at St. Brides super Ely, near Cardiff, was attended by many relatives and friends, including Mr. A. M. Graham, Regional Veterinary Officer, Mr. A. W. Smith, Divisional Veterinary Officer (also representing colleagues of Division 39/40 and the Association of State Veterinary Officers), and Mr. J. B. Tutt (representing the Southern Counties Veterinary Society). Floral tributes were sent from other members of the profession who were unable to attend. The simple ceremony in the little village church was singularly impressive.

To his sisters and relatives we extend our deepest sympathy.

### INTERNATIONAL CONGRESS OF ANIMAL REPRODUCTION

The next International Congress of Animal Reproduction will be held in Holland on June 5th to 9th, 1961. The date has been fixed so as to synchronise with the meetings of the European Society of Animal Production which it is believed will begin in Germany on June 12th, 1961.

## Letters to the Editor

*The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.*

### Professional Secretary

Sir,—The terms of reference and the limitations on the contract periods will encourage only the swashbucklers to apply for the appointment as advertised in THE VETERINARY RECORD. The announcement in the national press is quite different.

The short list should be published, and then approval of the suggested Professional Secretary should be obtained by election by B.V.A. members. The period of the appointment should be in proportion to the votes obtained, with a maximum of twelve years.

Yours faithfully,
A. W. HART.

12a, South Street,
Dorchester,
Dorset.
*December 20th*, 1958.

Sir,—What type of man does the British Veterinary Association expect to attract by its ridiculous advertisement for a Professional Secretary? It seems perfectly clear that these "probationary" and "renewal" periods are designed to attract an innocuous "yes man"—certainly no one worth his salt will apply for the position. The salary is hopelessly inadequate, there is no mention of expense allowances, car, or accommodation.

If the B.V.A. are looking for a secretary, public relations officer, politician, and orator rolled into one person, then they must be prepared to offer satisfactory conditions. There can be no doubt that such a person is vitally needed by our profession, but cheese-paring will not attain this object.

I suggest the conditions should be as follows: a commencing salary of £3,000 per annum; no probationary or five-year limitations; an unlimited expense account to enable the person appointed to be a real P.R.O.; a car worthy of his position (or do the B.V.A. wish him to take his guests by tube to Lyons); a house, centrally situated, in which he can entertain the principals in all other professions.

The Council of the B.V.A. must jerk its head out of the sand and look to the future. They must rid themselves of this persistent idea that £2,000 to £2,500 is a proper salary. Any economist will tell them that after tax and other deductions a professional man with a family, living reasonably well in a house in London, will not be able to afford a car or entertainment of any kind. In fact he will be lucky if he can afford a new suit at the end of his "five-year run."

I am quite certain that the vast majority of practitioners would willingly contribute an extra guinea a year to enable the B.V.A. to offer the conditions I recommend.

Yours faithfully,
E. C. STRAITON.

132, Lichfield Road,
Stafford.
*December 18th*, 1958.

### Vaginal and Uterine Prolapse in the Ewe

Sir,—Following the clinical communication from Mr. O. Y. Mayor (October 18th, 1958) in THE RECORD, it may not be out of place to put forward some thoughts and practices relative to these conditions as found in the Antipodes.

Pre-parturient prolapse of the vagina, and of the uterus to some extent, involving at least the cervix, is far from uncommon in the north-east of Tasmania. It is particularly to be noted in ewe flocks run on hill-

sides, or in paddocks which have steeply inclined banks, gulleys, or similar contours. The condition appears to be more frequent in older ewes.

It could have some link up with pregnancy toxaemia, inasmuch as it appears commonest in flocks where the husbandry has failed to maintain a rising level of nutrition throughout, and towards the latter stage, of pregnancy. This is a purely personal idea, but I have found that often where pregnancy toxaemia is manifest in a flock there are more cases of prolapse than is found in flocks where the husbandry is more liberal.

If there is no specific link up with pregnancy toxaemia, the conditions which provoke that condition may well contribute to prolapse. Sheep feed and lie with their heads up hill, thus pressing the weight of the gravid uterus towards the vulva. Hilly country is all too often of marginal or low nutritional value; under-nourishment leads to slackness of ligaments, sinews, and muscle tone; constant pressure and friction (?) of the gravid uterus on the vagina must cause some discomfort and inflammation which might lead to expulsion of the offending organ, greatly aided by the slackness of the tissues involved. To the best of my memory it is mainly wool sheep, or cross breeds of them, that are chiefly afflicted. While there is often a considerable twin crop in the flocks concerned I have no actual note of the number of prolapsed ewes which produce twins.

In consideration of Mr. Mayor's method of correction, I wonder if he has tried a common practice in this part of the world which is as follows:—

A length of new plain fencing wire 2 to 3 feet long is bent into a U at the middle. Each arm of the U is bent outwards at a varying distance from the centre, according to the size of the particular animal to be treated. The U is then inserted into the vagina, the prolapse having been reduced, so that the blunt turn is pressed against the cervix. The arms of the U are now "fitted" around the buttocks of the ewe, an eye is twisted into each end, and this is tied with twine, or by the wool of the sheep itself, to the flank of the thigh. The whole procedure depends upon the satisfactory fitting of the truss to the individual ewe, but when correctly performed it holds the cervix, and therefore the vagina, in the proper place and yet avoids all the troubles and dangers of sutures or projecting vulva clamps. With practice it is simplicity itself to use. Its greatest feature, apart from holding the prolapse in correction, is that it allows the ewe to deliver her lamb without having to have stitches etc. removed, as with parturition opening the cervix the U passes into the body of the uterus and the lamb is delivered either over or under it.

Most sheep masters make their own trusses as and when they need them, though there are one or two proprietary makes on the market having the wire covered with plastic tubing.

Yours faithfully,
F. B. HARDY.

Fonn Aline,
Kelso,
Tasmania

*December 18th*, 1958.

### Johne's Disease in Young Cattle

Sir,—We have recently experienced an interesting case of Johne's disease in a 9-month-old Aberdeen Angus cross stirk. A faeces sample sent to the veterinary investigation centre here aroused suspicion as to Johne's disease, and a complement fixation test carried out upon blood from this animal confirmed it.

We hope this report may be of interest to some of those who are wrestling with this problem, and the case prompts us to enquire of your readers whether they have ever encountered Johne's disease in cattle as young, or younger, than this.

Yours faithfully,
W. G. BLYTHMAN,
A. F. McCULLOCH.

16, Elsdon Road,
Gosforth,
Newcastle upon Tyne, 3.

*December 30th*, 1958.

### Destruction of Game in Africa

Sir,—Referring to the letter by Mr. R. C. U. Fisher, in your issue of November 29th, I should like to remind him that a Commission of Inquiry on Human and Animal Trypanosomiasis in Southern Rhodesia was appointed in 1955, and concluded that "having reviewed the various methods of control . . . it must be clearly stated that until the proper methods of application of these new measures have been worked out, it will be necessary to continue modified game destruction under more strict control."

The Trypanosomiasis Committee of Southern Rhodesia which is responsible for laying down the general policy of tsetse control includes the Game Warden and the Chairman of the Natural Resources Board, and is very far from being "motivated by a primitive blood lust." At the present time a particularly intensive and distasteful game destruction campaign is being conducted in the belief that this, with other measures, will stop a most serious fly-advance into a great ranching area; an area that, unlike some other parts of Central Africa, is definitely required for this purpose. Every effort is being made, by means of expensive fencing operations, to limit the shooting area, but one great difficulty is the fact that game will keep on breaking the fences and entering the shooting areas from the outside where, on the recommendation of this same committee, they are protected from organised destruction.

It should be realised that African game can only be preserved indefinitely where tsetse flies are absent, and the greatest single measure for game preservation is the rapid elimination of these flies from all areas; even if this be at the expense of many lives of game during the years of combat.

Yours faithfully,
H. E. HORNBY.

Poole Farm,
Hartley,
Southern Rhodesia.

*January 1st*, 1959.